DigitalVision

Nucoda

2014

Nucoda User Manual 2014

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Welcome

1

2014.1

Welcome 1

Nucoda User Manual 2014

Nucoda
Nucoda Look

Welcome to the Nucoda Finishing Environment from Digital Vision!

The Nucoda platform is the leading colour grading, finishing and mastering solution for film, television and commercials post-production. This manual will help you get the most out the system.

Product :	Nucoda
Version :	2014
Document Revision :	UM-2014.1-07
Date :	13/05/2014

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Overview

2

2014.1

Overview 2

- Nucoda
- Nucoda Look

Welcome to the Nucoda Finishing Environment from Digital Vision.

The Documentation section lists the documentation included with the application and where to locate it.

First Time Users

The User Interface chapter gives an overview of the application environment and GUI, but those who want to jump straight into creating projects may want to skip ahead to the Projects chapter and return to the User Interface section at a later date, after having acquired a feel for the product.

Documentation

Several items of documentation are included, all of which can be accessed via the "Nucoda Docs 2014.1" shortcut that is placed on your desktop by the installation program. You can also access the index page directly from :

C:\Nucoda\2014_1\docs\index.html

Install and Setup Manual

The Setup Manual describes how to install and configure the application. It also details installation and configuration of graphics and video hardware and important considerations for use of the software.

User Manual

This is the user guide that you are currently reading.

Release Notes

The release notes list all the new features, bug fixes and known bugs.

Precision Control Panel Documentation

The Precision Panel documentation includes an *User Guide* and a *Hardware Installation Guide*.

Valhall Control Panel Documentation

The Valhall Panel documentation includes an installation guide (giving information on the Valhall environment variables and setup), a user guide, and a quick reference labelled diagram of all the Valhall panel controls.

Hotkeys Reference Guide

The Nucoda hotkeys guide is a labelled keyboard diagram and summary page of all the Hotkeys available in the application. A shortcut to this PDF document is also placed on your desktop by the installation program.

Note that the application itself includes tool-tip labels on buttons and user-interface elements. These will pop up when you hover your mouse over a button and display some explanatory text.

New in This Release

Please see the *Features and Benefits* document for a description on new features.

Product Support

Product Support is available to all clients with a valid maintenance contract. To contact support, see the Contacts section.

User Forum

Digital Vision runs a web-based user forum at the following address :

http://forum.digitalvision.se

Please consider joining the forum and taking part in wide-ranging discussions with our growing community of users.

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The User Interface

2014.1

The User Interface 3

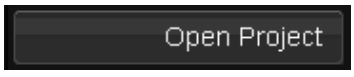
This chapter will give you an overview of the user interface and some basic components of the application.

Interface Conventions

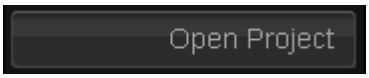
The following interface conventions are used for various elements.

Functional

A function button performs a single action only.



Active and available function button.



Inactive function button.
If a button is not available for selection, it is greyed out.

Secondary Windows

The two dots preceding the button name indicate that a new window or dialog will open when pressed.

Drop-down Menus

The three vertical dots preceding the button name indicate that this button is a drop-down selection list.

Numeric Sliders / Data Entry

Click, hold and drag the mouse left and right in the data field to increment and decrement the data value. You can also click the mouse once in the data field to select, then type in a data value.

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Toggle Buttons

Toggle button off.

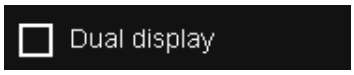
Toggle button on.

A group of three toggle buttons, with one enabled.

Radio Buttons

A group of two radio buttons. In a group, only one option can be selected at one time.

Option Buttons



Option button off.

Option button on.

Information Dialogs

Informational
Informational messages, no user interaction required.

Query
Request for user input.

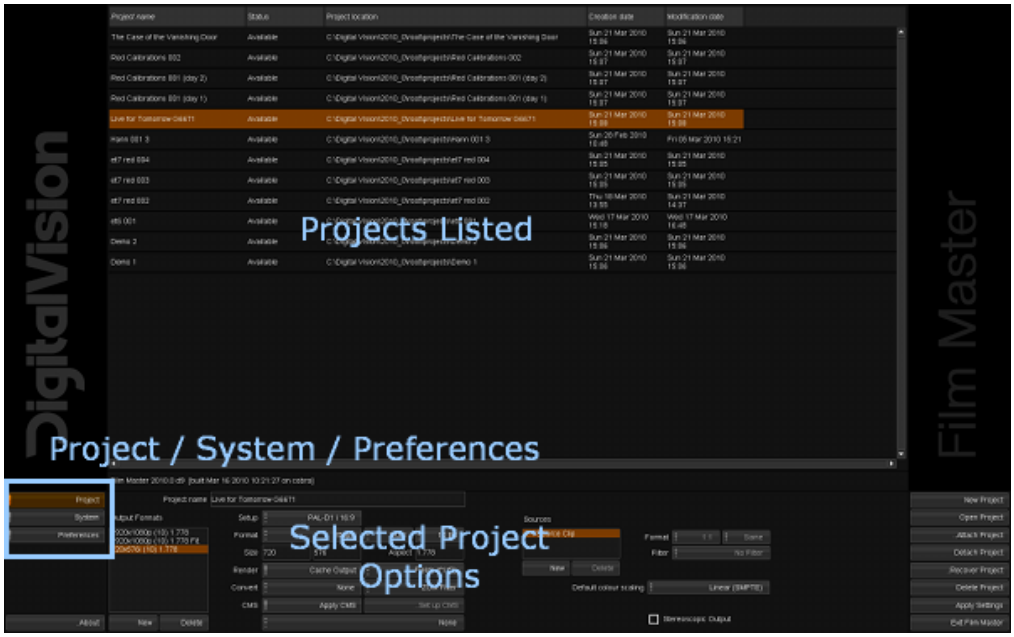
Warning/Error
Warning or error alert. Sometimes including a request for user intervention.

Main Screens

The application environment is composed of a number of components within which you do the majority of your work. These include the main *Project Screen*, the *Project Desktop* and the *Project Library*.

Project Screen

The *Project Screen* is the first screen visible when we launch the application. This is where we create and manage our projects and access our global preferences.

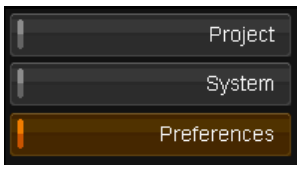


Main Project Screen

See the Creating a Project and Project Management sections of this manual.

> The active component screen will be high-lighted *orange*.

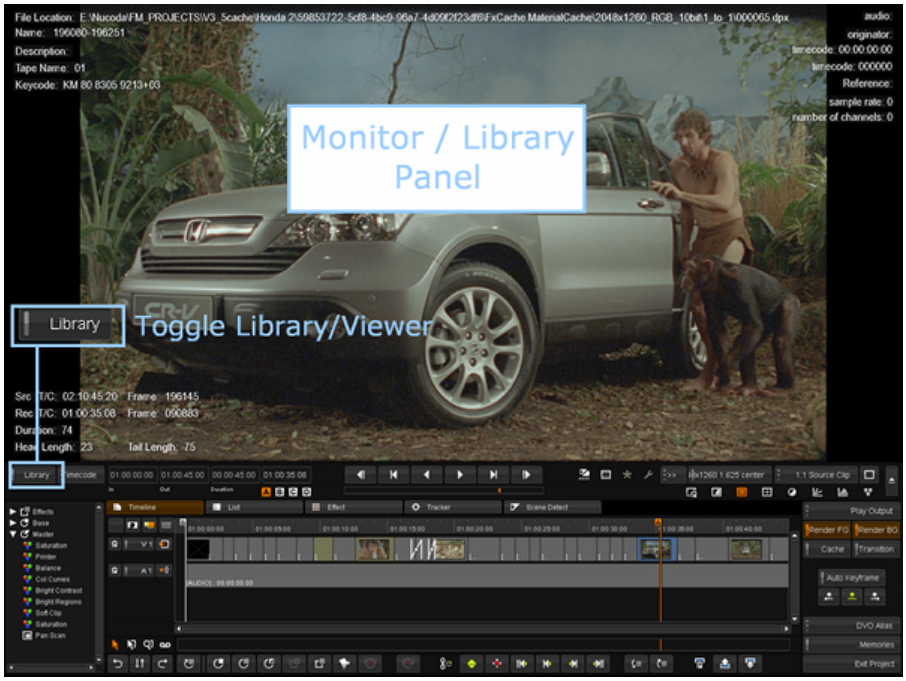
To access the component, press the corresponding button on the main screen :



For the *Preferences* component, see the appendix Application Preferences.

Project Desktop

The *Project Desktop* is the main working environment inside your project.

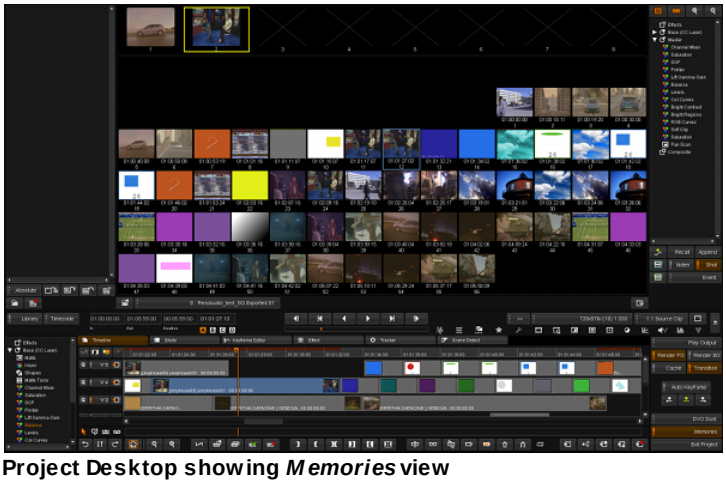


The Project Desktop showing the viewer area and the composition timeline below.

The desktop is composed of three main views :

- The *Monitor* - in dual monitor mode, this will be displayed on your second monitor
- The *Composition Timeline* and GUI controls
- The *Memories* view - for notes, memories and grouped shots

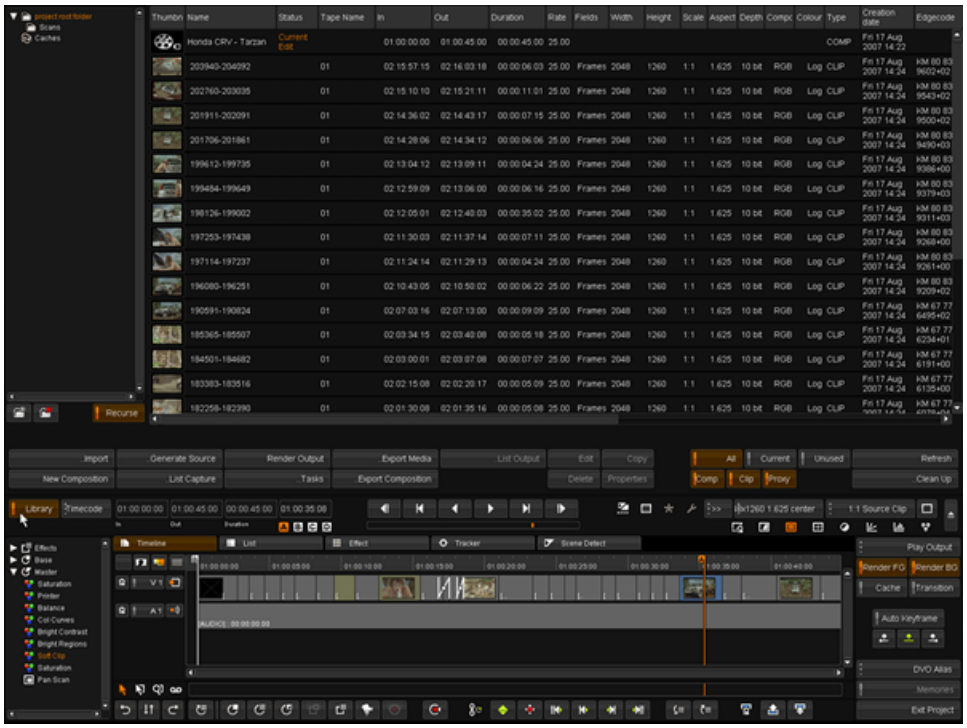
In *single-screen* mode, the *Monitor* panel can display the *Monitor*, the *Library* or the *Memories* panel.



Project Desktop showing *Memories* view

Project Library

The *Project Library* is where we import and export media, create compositions and manage our project assets.



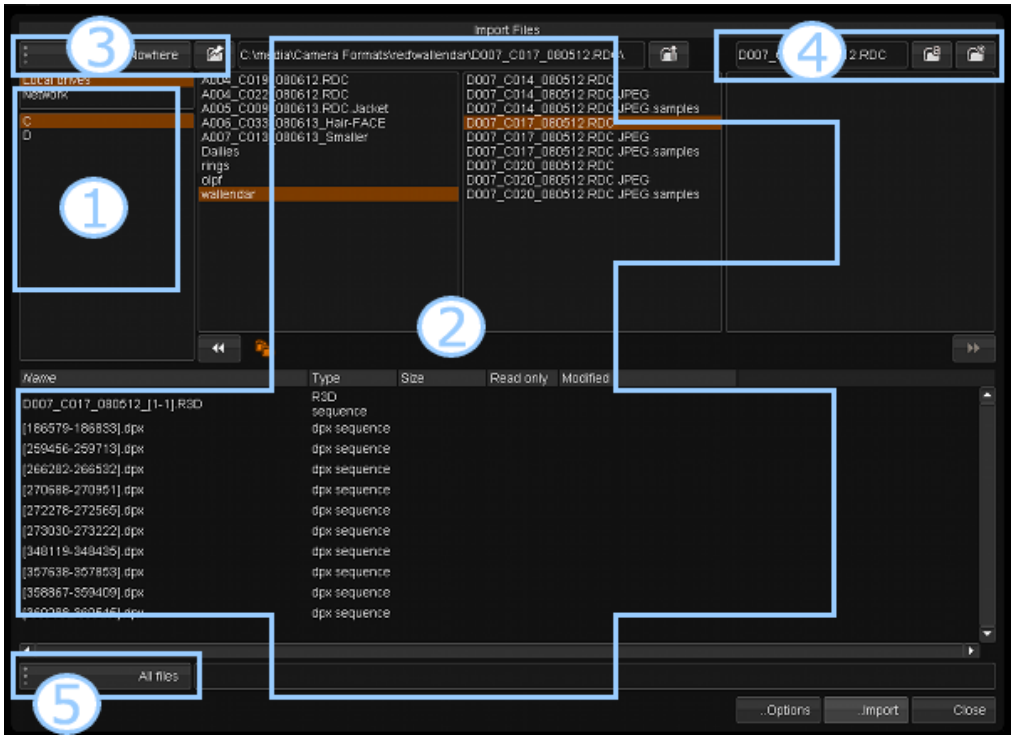
See the Project Library section of this manual.

File Browser

A sophisticated file browser is used throughout the application. It is used to navigate both local and remote filesystems. You will use the file browser component in many places, including :

- Import and export of media, list files and LUT files.
- Attaching and detaching projects.
- Capturing material from lists.

This section describes the file browser and its various components.



File Browser (Import Media version) showing main functional areas

1. Network and Drives
2. Navigation and Folder hierarchy
3. Folder Bookmarks
4. Folder Management
5. File Type Filter

Network and Drives

To the left of the main file browser panels are the panels that allow :

- *Network* folder and *local* folder browsing
- Local *drive* selection or
- Network share selection

Local Drives

When browsing *Local drives*, the available *drive letters* will be shown in the panel below :

Local drives displaying available drive letters.

You can double-click a drive letter to jump to the root of the drive.

Network

When browsing the *Network*, the panel will show other systems available on the local network :

Network displays available network systems

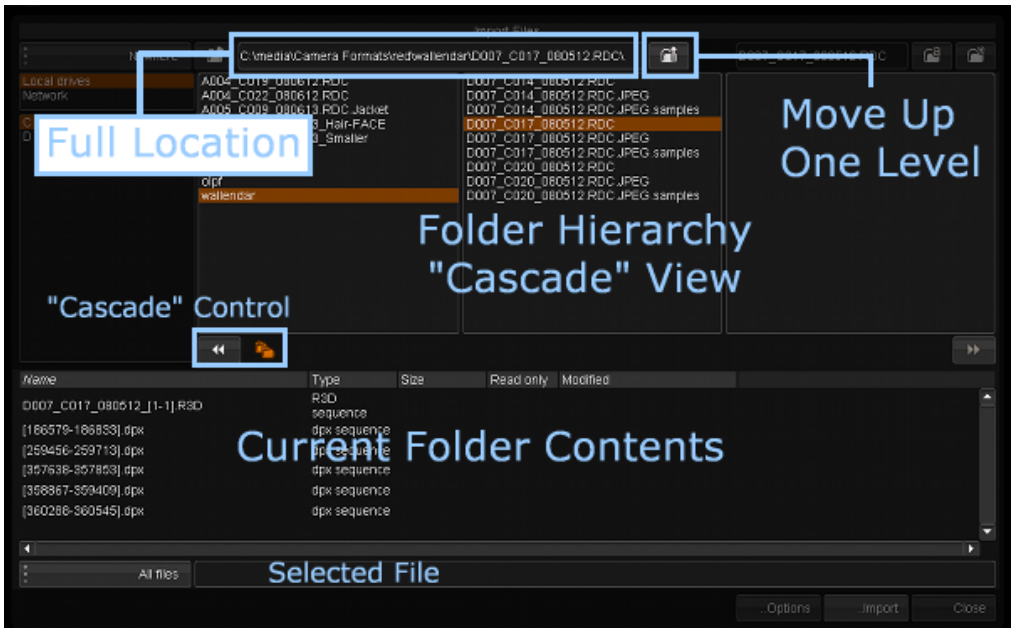
The top-level folder list will display the available *Network Shares* on the selected system :

System Magners has a shared folder "S on Magners".

If the target system (*Magners* above) requires **authentication**, you will need to do this before starting the application.

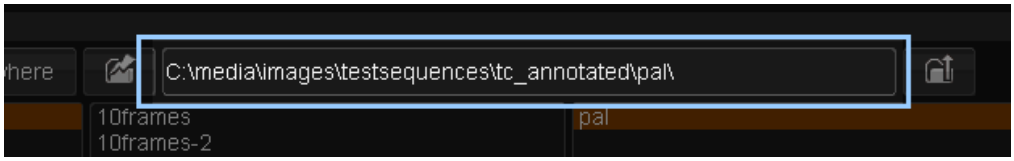
Folder Navigation

Once we have selected a *local drive* or *network share*, we navigate the filesystem folders via the central panels.



Full Current Location

The file browser always shows you the **full current location** to your current folder in the box at the top :



Full current location

Folder Navigation

The button to the right of the location display lets you quickly go up one folder level :

Button to move up one folder level

You can navigate up and down both local and remote folders using the panels in the centre of the window. These panels have **two** modes of display - *Cascade Mode* (multi-pane) and *Single Mode* (single pane).

These central panels display **folders only**, never files.

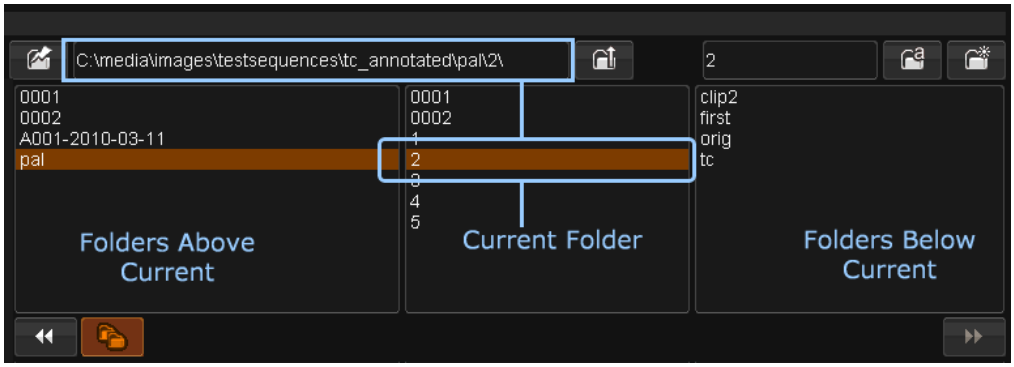
Cascade Mode

In *Cascade Mode*, the central area will show up to three panels. Each panel will display the *folders* that exist :

- In folder above us (left pane)
- In current folder (middle pane)
- In folder below us (right-hand pane)

The *current* folder is always **high-lighted in orange**. Click any folder to make it current.

Enable *Cascade Mode* via the button :

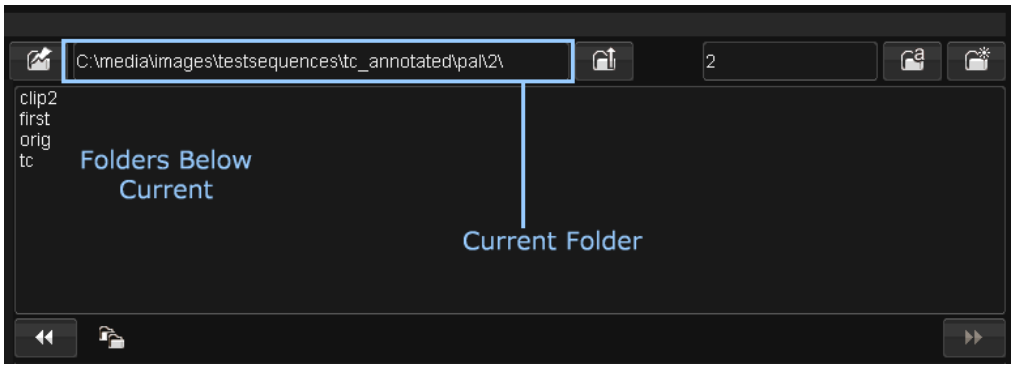


Cascade Mode showing three folders (above and below current)

In *Cascade Mode*, you can jump **backwards (up)** and **forwards (down)** in your location history using the arrow buttons below the panels :

Single Pane Mode

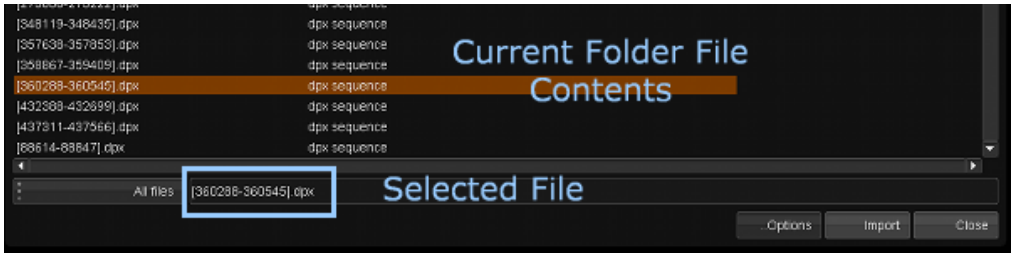
In *Single Pane Mode*, the central area shows a single pane and the folders inside (below) the current folder only.



Single Pane Mode. Display folders below current folder location only.

Folder File Contents

The files within the current folder are displayed in the bottom pane.



Files that exist within the current folder are displayed in a tabular format (see the Tables section for a discussion of table use).

The files displayed can be filtered by file type.

Contiguous file sequences (i.e. no gaps) are *compressed* to display only the start and end frames i.e.

```
export097738.dpx, export097739.dpx, ..., export097812.dpx
```

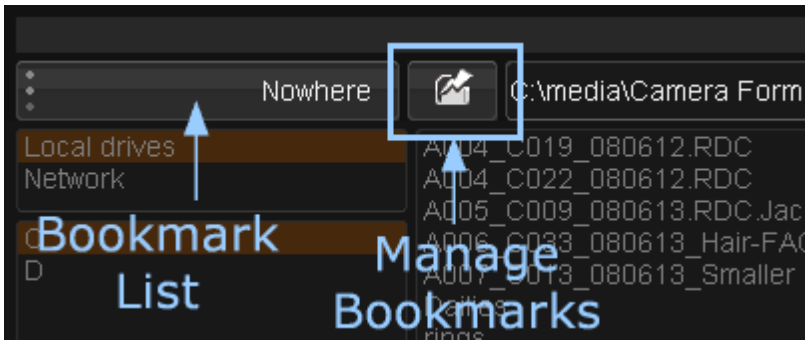
is displayed as :

```
export[97738-97812].dpx
```

Use **CTRL+R** to **refresh** the file browser.

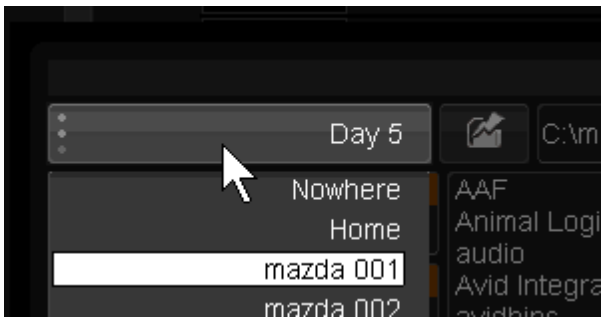
Folder Bookmarks

Folder Bookmarks let you store a folder location and **jump** to it via a drop-down list.



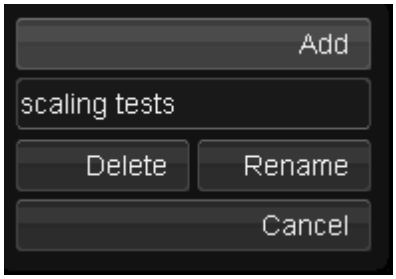
Using Bookmarks

To jump to a previously bookmarked folder, select the bookmark from the bookmarks drop-down list :



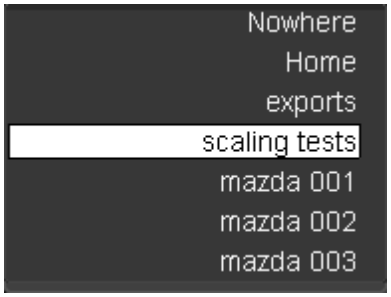
Adding Bookmarks

To *add* a bookmark for the current folder, or *manage* bookmarks, press the ***Bookmarks*** button. A dialog window will open. To add a bookmark for the current folder, press the ***Add*** button :



Bookmark dialog

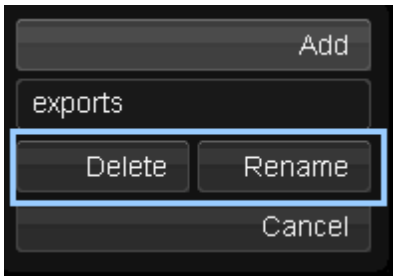
The bookmark will be added to the list and available for use :



New bookmark in the list

Delete and rename Bookmarks

To *delete* or *rename* a bookmark, select and jump to it and use the appropriate button.



Folder Management

At the top-right, the file browser displays the name of the current folder.

To the right of the current folder name are the two buttons :

- *Rename Current* folder
- *Create New* folder

Rename Current Folder

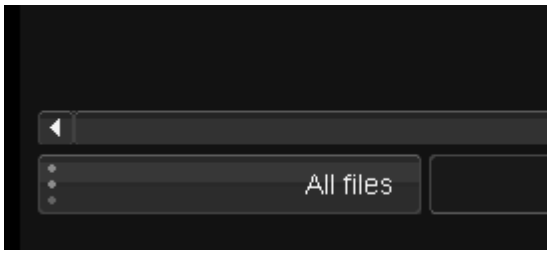
Type a new name for the folder and press the *Rename Folder* button.

Create New Folder

Type a new name for the folder and press the *Create New Folder* button.

> The new folder is created within the *current* folder.

File Type Filter



The *File Type Filter* drop-down list lets you limit the display of files in the current folder to the specified file type only.

Use the drop-down list and select the desired filter :

Tables

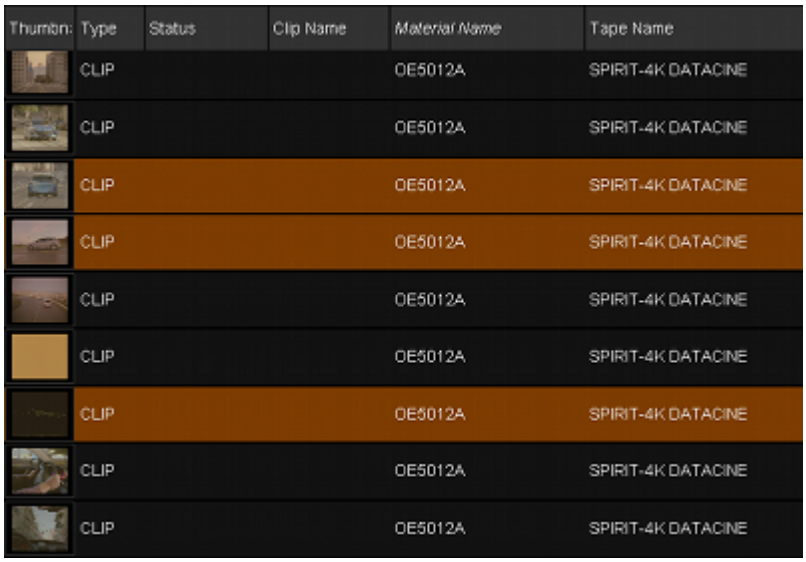
Many areas of the application display information in a *tabular format*, including the library, video I/O screens, capture lists, project list and file browser.

Tabular display of assets in library

Tables behave in a similar manner throughout the application.

Selection

Select items by *left-clicking* with the mouse. Selected items are shown in *orange*.



Multiple non-continuous items selected

Multiple Selection

To select multiple items :

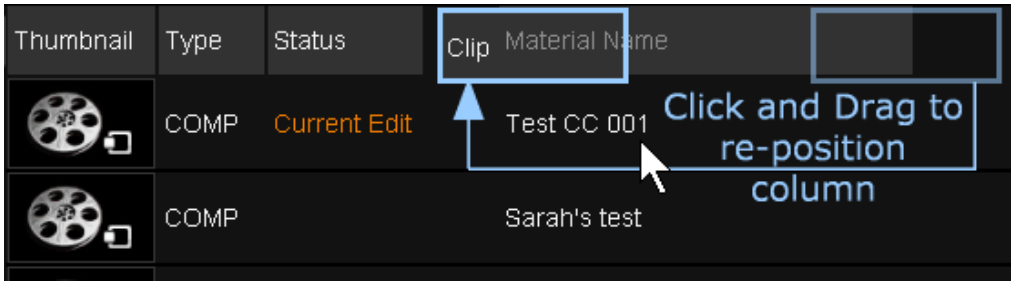
- **SHIFT + select** to select a *continuous* range
- **CTRL + select** to select *non-continuous* items (as shown in image above)

Deselection

To deselect an item, select it with **CTRL + select** again.

Column Order

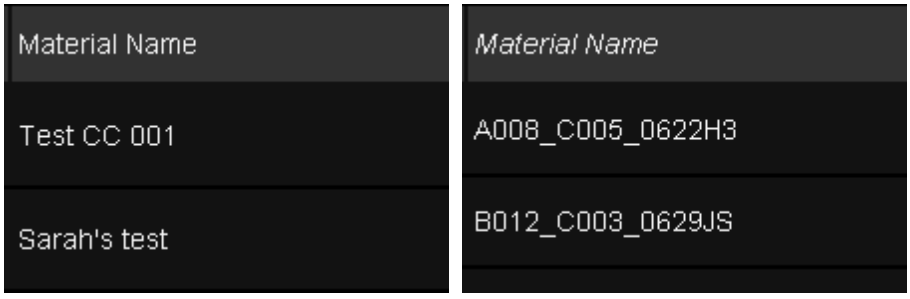
To re-order the columns, click and drag a column title :



Repositioning a column.

Column Sort

To sort the table display on a column, **click** the column title. Clicking again, reverses the sorting :



Ordering on *Material Name* (title changes to italic).

Column titles change to *italics* when sorted on the column.

Remove Sort

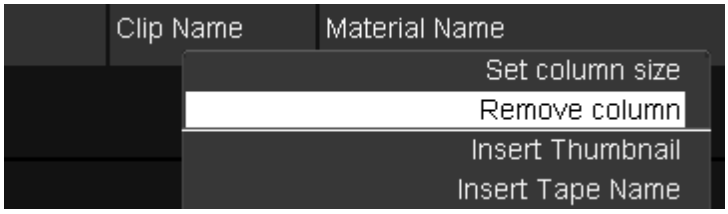
To remove the sorting, click on another column (or in the library, click on the the *Thumbnail* column title).

Show and Hide Columns

You can *show* (insert) or *hide* (remove) a column by using your mouse and a right-click :

Remove Column

Right-click the mouse over the column you want to remove and choose *Remove Column* :

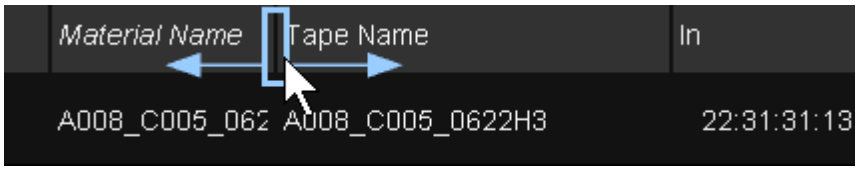


Insert Column

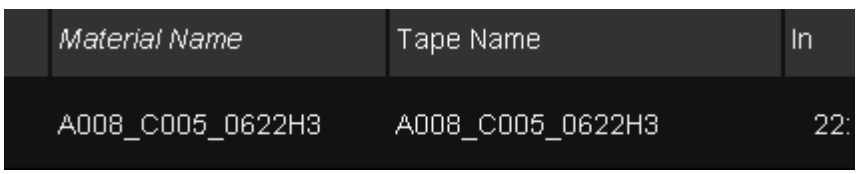
Right-click the mouse in the contents title area where you want to insert the new column and choose the column you want to insert :

Column Sizing

You can adjust the *width* of columns by clicking and dragging the column *boundary* with your mouse :



Click and drag to stretch Material Name column width out.

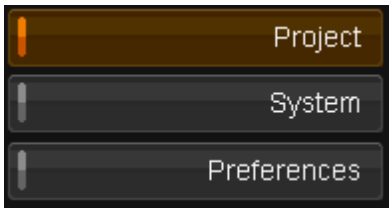


Projects

4

2014.1

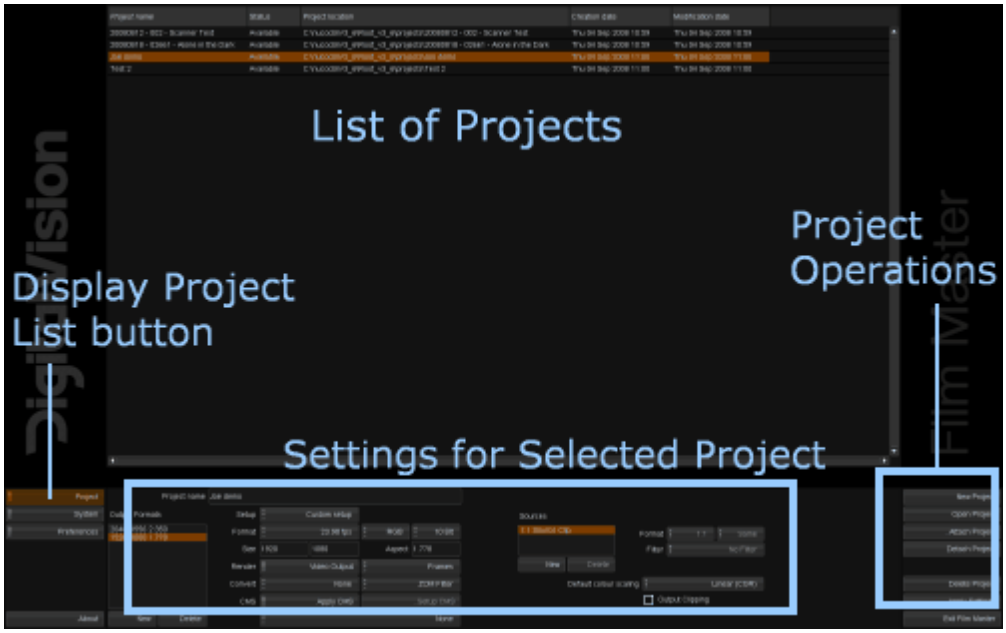
Projects 4



Projects are used to store and organise your work. This includes the project library containing all your compositions and source material, all your edits and grades specific to each composition, definitions of all the project output formats and all other project state (such as play heads, cached renders, window positions, undo stack etc.).

The *Project* Screen is the first screen displayed when you launch the application. This is where you create and manage your projects.

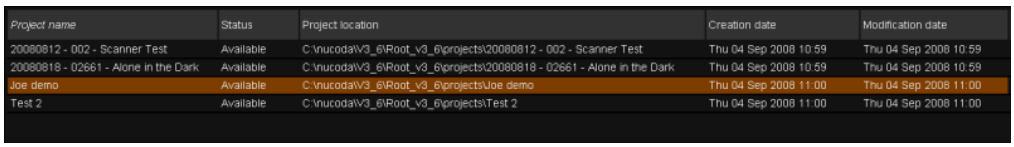
Below the project list is an area that displays configuration settings for the currently selected project. To the right of these settings in a group of buttons that let us create, open and perform various other actions with projects.



Whenever you select a project from the project list, the project settings panel will refresh to show you the current settings for the selected project.

Project List

The top panel lists all available projects:



Project name	Status	Project location	Creation date	Modification date
20080812 - 002 - Scanner Test	Available	C:\nucoda\V3_6\Root_v3_6\projects\20080812 - 002 - Scanner Test	Thu 04 Sep 2008 10:59	Thu 04 Sep 2008 10:59
20080818 - 02661 - Alone in the Dark	Available	C:\nucoda\V3_6\Root_v3_6\projects\20080818 - 02661 - Alone in the Dark	Thu 04 Sep 2008 10:59	Thu 04 Sep 2008 10:59
Joe demo	Available	C:\nucoda\V3_6\Root_v3_6\projects\Joe demo	Thu 04 Sep 2008 11:00	Thu 04 Sep 2008 11:00
Test 2	Available	C:\nucoda\V3_6\Root_v3_6\projects\Test 2	Thu 04 Sep 2008 11:00	Thu 04 Sep 2008 11:00

Project properties displayed are :

- Project Name
- Status (e.g. Offline, Available)
- Project Location
- Creation Date
- Modification Date

The *Project List* is displayed a standard table. For more detail on tables and their use, see the Tables section.

Project Status

The *Status* field can have two values :

- ***Available*** : the project is available for use and *exists* at the specified location
- ***Missing*** : the project folder cannot be located at the specified location

If a needed project is listed as *Missing*, you will need to locate the project folder or retrieve from backup. Then you can :

A. *Move* project folder back to original location or
B. *Detach* the missing project from the list and then *attach* it from its new location.

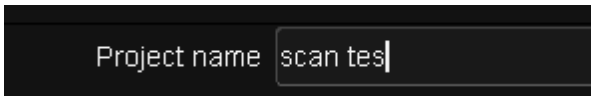
Creating Projects

Creating a project consists of defining :

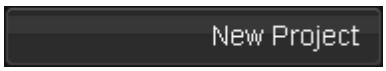
- One or more output (target) formats. **Required**.
- One or more source definitions (e.g. proxies). Optional.

The project screen has 3 main panels. At the top, a list of all available projects, along the bottom the project configuration settings, and to the right the project options:

To create a **new project** :

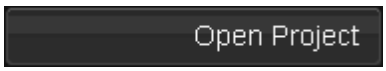


- Type the name of the new project in the project name text field.
- Press the ***New Project*** button.



Usually, a new project will take its initial settings from the last project selected. To create a completely *fresh project* (with all settings as default), see below.

Now configure the project settings (e.g. output formats, sources, colour space etc.). Once done, press the ***Apply Settings*** button or just ***Open Project***.



If project settings have been *changed*, ***Open Project*** will prompt you to apply them before opening.

Creating a Fresh Project

Currently, a new project is always created using settings defined from the currently selected project (except for the very first project created). To create a new **fresh project**, follow this procedure :

- Create a *dummy* project (e.g. called "delete me")
- Open this dummy project
- Exit project
- Delete the dummy project
- Exit application

On application restart, no project will be current and the default settings will be used for a *Untitled Project.*

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Output Formats

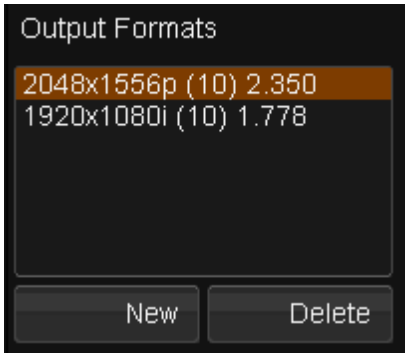
In addition to naming your project, the project configuration settings panel along the bottom of the project screen allows you to specify your intended *output* format(s) and any additional *sources* you may want to create:

Defined project output formats are displayed on the left. The project *master* format is the first in the list.
The settings for the selected output format is displayed to the right.

> Each output format has **independent** settings.

The output formats defined determine the available display, playback, render and output formats for the project. You can modify the output formats defined for the project anytime.

Master Output Format



The master format is always shown at the top of the output format list and cannot be deleted.

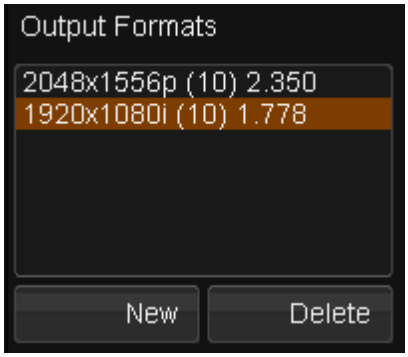
> It is recommended that the master format be defined to match the most common format of the *source material* you will be using inside the project.

Some common formats have been provided for use as quick defaults (e.g. PAL, HD 1080) and these are listed in the *Setup* drop-down menu. Selecting

one of these formats will automatically update the frame rate, image size and aspect ratio attributes to the corresponding values for that format.

If you change any of these default values, the setup format will automatically change to being a Custom Setup.

Additional Output Formats



All additional output formats are listed below the master format and are completely *independent* of it. To create a new output format :

- Press the ***New*** button located below the *Output Formats* list box. A new format will be created.
- Then configure the output via the *Setup* drop-down list or edit the individual parameters.

To delete an output format, just select it from the output formats list and press the ***Delete*** button.

Editing the Output Formats

To modify an output format :

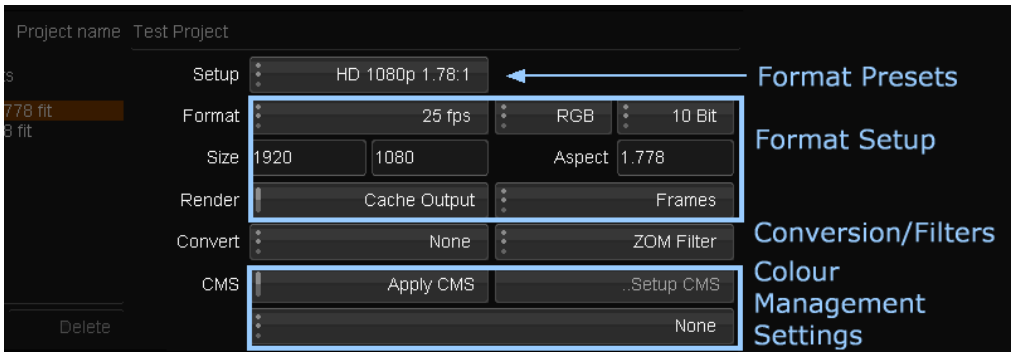
- Highlight it in the output formats list. The settings displayed on the right switch to the selected format.
- Alter any of the output format attributes.
- Press the ***Apply Settings*** button to apply any changes made.

You will be warned if you try and move away from the main project screen if any settings have been changed.

Output Format Attributes

Each output format has a set of attributes defined, including :

- Format Presets
- Frame Rate
- Colour Channels
- Colour Depth
- Render Resolution
- Viewing Aspect Ratio
- Render Options
- Conversion and Filter settings
- Colour Management System (CMS)



When setting the attributes for your *output formats* you are defining the different ways that you wish to render material. It does not affect the source material that you will import, which has its own source format.

Format Presets

There are a variety of *predefined* formats available in the preset drop-down list. Selecting a preset will configure the other settings appropriately.

Format Setup

You can configure the format settings independently of the the preset chosen.

Frame Rate

Use the frame rate drop-down list to select the frame rate for the composition timelines created in the project

If you selected a default setup, it will automatically set its own frame rate, but you can change this. If you do change it, the default setup will change to Custom Setup.

You will be able to see the frame rate of each of your compositions and

media in the project library.

It is possible to create compositions with different frame rates within a single project. The ***Library/New Composition*** button always creates a timeline at the frame rate set on the currently selected output format. You can create a composition at a different frame rate by changing the rate of the output format (at the project screen), creating the ***New Composition***, then reverting the output format rate again.

Colour Channels

Default : RGB

Use this drop-down to select the colour channels to use. This defines the components used in any cache generated.
This is an advanced setting. In general, do not change this.

Component Bit Depth

Default : 10 bit

Use this drop-down to select the bits per component (colour accuracy) that you want the output format to render.

Component Bit Depth is an *advanced* setting and usually should be left at the **default**.

Render Resolution

The image width and height, in pixels, are set automatically when you choose one of the preset formats from the setup menu. If you want to define a different image size for your output format then simply enter the values into the appropriate text boxes; in doing so, the default format will automatically change itself to *Custom Setup*.

Viewing Aspect Ratio

The aspect ratio for viewing images is set automatically when you choose one of the default formats from the setup menu. If you want to define a different aspect ratio for your output format then simply enter the value into the appropriate text box; in doing so, the default format will automatically change itself to *Custom Setup*. You will be able to toggle the aspect ratio correction on/off when viewing images.

Render Options

Cache Output

Default : OFF

Enabling *Cache Output* will cause output caches to be generated (in the

output format) if the source format ***differs*** from the output. If the source format ***matches*** the output, an output cache is generated if any *Master* layer effects are added. *Cache Output* can be set independently on any project output format.

Enable this :

- To ensure everything is rendered and ready to lay-off to video.
- On a 10 bit secondary output format when your master format (and sources) are half-float or 16 bit. *Cache Output* will ensure that the secondary format caches are 10 bit which can improve realtime performance.

This cache is in **addition** to the standard (source-format) cache.

frame / field rendering

Full support for *interlaced* video formats is included.

Options :

- **frames**
  Progressive format, no fields.
- **fields (f1:f2)**
  Fields, with field order f1:f2 **[PAL]**
- **fields (f2:f1)**
  Fields with field order f1:f2 **[NTSC]**

Field settings will enable field edits/cuts in the composition, field viewing, playback and rendering.

Conversion Settings

If your source images are a different resolution to your defined output, you can choose if and how they are scaled and/or cropped for output.

None

Displays the source image in its original size. This may result in a *cropped* or *blanked* image, depending on the difference between the source and output resolution and aspect ratio.

Auto Fit

Scales the source image to the size of the output format.

Auto Crop

Crops the source image and scales it to the size of the output format.

Center

The center of the source image is mapped to the center of the output

format maintaining the source image aspect ratio. This may result in a cropped or blanked image, depending on the difference between the source and output resolution and aspect ratio.

Filtering

The *filter type* selects the mechanism used to transform the pixels in the source image to the new output. This mechanism involves calculating the value of an output pixel as an aggregation of contributing source pixels. How the various pixel contributions are weighed defines the filter.

In order of worst to best (or increasing accuracy) :

No Filtering

Only the source pixel at the center of the projected boundary is sampled. This method is very prone to visible artefacts such as jagged image edges.

Bilinear Filtering

The four pixels in the source image that are closest to the center of the projected boundary are sampled. Their weighting is based on the relative proximity to the center of the projected pixel boundary. This produces an accurate colour result but doesn't cut down aliasing as well as Gaussian does. Box and bilinear will produce very similar results for small scale reductions, but due to the nature of the software coding bilinear is generally the fastest of these two options.

Box Filtering

All pixels falling within the projected pixel boundary are sampled and their weight is proportional to their area that lies within the projected pixel boundary. Box and bilinear filtering will produce very similar results for small scale reductions, but box can produce better results for larger scale reductions.

Gaussian Filtering

All pixels falling within the projected pixel boundary are sampled and weighted using a gaussian filter kernel. This produces better results than the box or bilinear filters in so far as it results in less aliasing, but is slower.

ZOM Filtering

Uses a *sinc filter* and is the best general filter for *up* and *down-scaling*, providing a sharp result without artefacts. **This is the default setting**.

Lanczos Filtering

A windowed form of the sinc filter which may give better results in some cases.

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Colour Management System (CMS)

Each defined output format can have an independent colour *Look Up Table applied* (LUT) as part of your *Colour Management System* (CMS).

A variety of LUT formats and CMS systems are supported, including the *Nucoda CMS*, *THX Cinespace* and *Kodak*.

The LUT can be used in two ways :

- As a viewing only LUT. The LUT is not rendered on the final output. The LUT can be selected and toggled on/off inside the project.
- As a rendered LUT on the output. Pressing the ***Apply CMS*** button marks the selected output format with CMS and burns in the LUT on this format.

Sample CMS LUT files are provided in the folder :

```
C:\Nucoda\2014_1\root\cms
```

Project Sources and Proxies

Project *Sources* refer to source material available inside a project and how the source media is presented.

The "1:1 Source Clip" source is always present and refers to your pristine, original source material (imported or captured), at whatever original resolution.

Optionally, you can add one or more *proxy* sources via the ***New*** button.

A proxy source will act as a **substitute source** in the project.

You may decide to add a *proxy* source if :

- Your original sources are located on a slower storage device (e.g. network). In this case, you may wish to add a "1:1 Clone" source to ensure fast access to (local) fast storage.
- Your original sources are large, you may wish to add a "2:1" proxy to

improve rendering speeds and realtime performance.

To add a new source, press the ***New*** button below the *Sources* list.

Format

The *format* and *filter* type of the selected proxy is shown to the right of the *Sources* list.

The format allows you to change the proxy **scale** and **bits per component**.

Scale

Set the scale compared to the source media :

- 1:1
- 2:1
- 3.1 etc.

Bits Per Component

Set the colour component depth.

Same	Same bit depth as *original* source media
8 Bit	Set proxy to 8 bits per component
10 Bit	Set proxy to 10 bits per component
16 Bit	Set proxy to 16 bits per component
Half	Set proxy to *half-float* bits per component.

Proxies are created in the DPX file format **except** *Half* format, which are created as *EXR* files.

This is an advanced setting.
In general, do not change the bits per component but leave as "Same".

Filter

For non-1:1 proxy sources, you can apply a *filter* to improve the proxy image quality.

The Filter options are described in the *Filtering* section in Output Format Attributes.

Project Colour Scaling

The default colour scaling is a **per project** setting and is defined via a drop-down list below the proxy setup.

These scaling modes (defined below) affect :

- Video capture and layoff
- Timeline monitoring via SDI – including : Timeline filler, Transitions , Pan/Scan blanking, Fade to Colour
- Colour tool behaviour (black/white pivot points etc.)
- Scene detection

Be very careful with this setting.
If you change the *scaling* on an existing project, a warning dialog will request confirmation before application of the change. The change will affect SDI monitoring, capture and layoff settings and the mode used in new colour tools. **It may also cause a re-render of colour adaptive tools on your timelines.**

See the *Colour Scaling* section in the *Install and Setup Manual.*

Attach/Detach Project

Attach Project

We can only open and edit projects once they appear in our main project list.

The ***Attach Project*** button lets you insert an existing project (project folder) into our project list.

Clicking the ***Attach Project*** button brings up the file browser so that you can select the location of the project (folder) you want to add to the list. Select the project folder and click the OK button, or browse inside it and click OK.

The project will then appear in your project list and you can select it to open.

You should only import projects that were created on the same version of the application software, e.g. v2013.3 projects should not be imported into v2014.1

Detach Project

The ***Detach Project*** option removes a project from your project list.

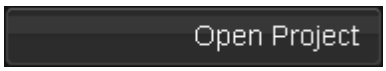
It does not delete the project.

If you want to open the project again at a later date you need to re-attach it using the Attach Project button.

You will not be asked to confirm project detachment.

This is a useful tool for moving a project from one computer to another, or removing a shared project from your project list without affecting users elsewhere.

Opening Projects



To open a project, double-click the project on the main project screen, or select it and press the *Open Project* button.On opening the project you will be taken to the *project desktop*.

When you open a project, if any of the project configuration settings for that project have been changed but have not been applied with the ***Apply Settings*** button you will be asked if you want to apply the new settings at this point. If the changes were unintentional you can say no and they will be discarded.

The open project button will be disabled if there is no project selected or if the selected project has a status of *Offline.* An *Offline* project means that the underlying project data folder is not located in the expected location.

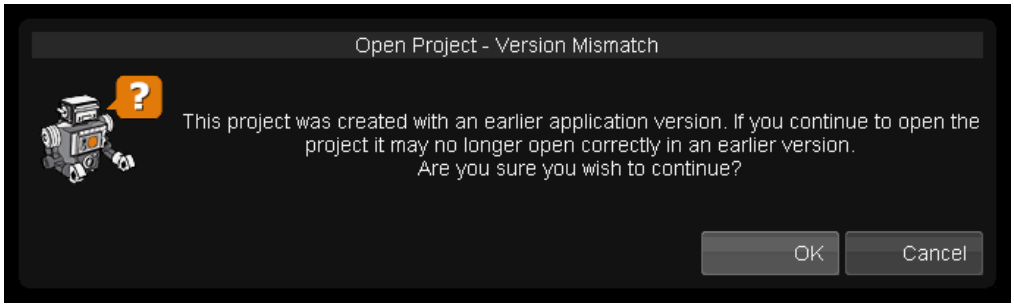
Warnings

You may sometimes see a warning when opening a project. This may relate

to a *version mismatch* or to *missing cache* renders.

Version Mismatch Warning

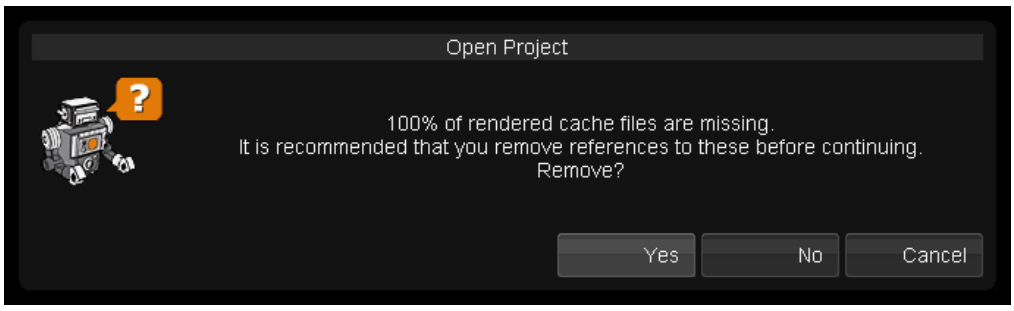
If you open a project that was created with an earlier application version, you will receive a warning dialog alerting you to this fact.



> **!** It is *usually* safe to open a project created with the same Major.Minor version as used currently (i.e. 3.6r1 to 3.6r2). However, projects created in earlier Major.Minor versions may not be safe (e.g. 3.5r7 to 3.6r1).

Missing Caches

If some (or all) of the rendered cache files cannot be located on disk, you will receive a warning alerting you to this fact.



This may occur if :

1. The cache (`cacheRootDir`) volume is unavailable
2. The project has been moved and attached on a different machine
3. After a crash etc.

For case (1), you may wish to press ***Cancel*** and investigate. For other possibilities, pressing ***Yes*** will delete the cache references before opening the project (your timelines will need rendering).

> **!** If you remove cache references your project will require **re-rendering**.

Delete Project

Press the *Delete Project* Button to delete the selected project. This **permanently deletes** the project and all its contents. You will be asked to *confirm* the deletion and also asked if you wish to delete the project *notes*.

To **keep** the project notes, *untick* the tickbox before clicking the *OK* button.

The project notes folder will be left untouched in the notes folder on your media root directory e.g.

```
C:\Nucoda\2014_1\root\notes\<project name>\
```

You can continue to view and use these notes in other projects.

Project deletion cannot be undone.

Recovering a Project

Using the ***..Recover Project*** button, you can revert to a previous version of a project. Select the project you want to roll back in time and press the *.. Recover Project* button.

This can be useful if you want to revert to a previous project state beyond your undo stack, or if you are unhappy with the past two hours of work you have done. It can also be used to recover a previous version of a project if the current one has a problem.

A project *snapshot* is taken every few minutes (every time the project is saved) and then these are rolled up and merged as the day goes on.

On pressing the button, a dialog window will open and allow you to select the desired version to revert back to :

Recover Project dialog window

Using the *From* drop-down list, select a previous project revision :

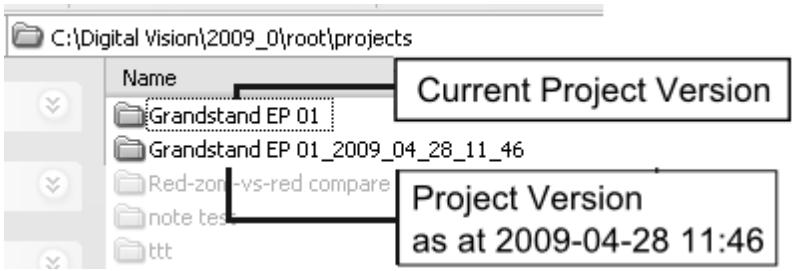
Then press the *Recover* button to do the recovery. The selected project is copied to a *backup* folder (*timestamped* as per the *Backup Folder* box, see below) and then **replaced** with the chosen project version.

The selected project will now be as it was at the stated date and time chosen from the drop-down list.

If you are reverting to a previous revision because your current project has a problem, it is best to revert in stages (one by one, newest to oldest) until you find a suitable version.

Backup Project

When you press the *Recover* button, the current project is backed up (copied) to a folder as named here. The backup is given a *timestamp* as a suffix. This backup folder is placed **beside** the current project :



Each backed up project is the entire state of the project.

In the example illustration above, we have :

- **Grandstand EP 01** - This is the current project - the project that opens. This project is actually a revision we have recovered.
- **Grandstand EP 01_2009_04_28_11_46** - This is a backup of the project created when we pressed Recover at 11:46 on 2009-04-28.

Note that recovery can only go **back in time**. Once you recover a previous version of a project, you cannot use this method to revert to a *later* version again. To do this, you can rename the appropriate project backup folder to the project name.

Location and Configuration

Projects are stored in folders located using the `projectRootDir` setting given in the main preference file :

```
C:\Nucoda\2014_1\root\general.prefs
```

The project folder will default to a subfolder :

```
C:\Nucoda\2014_1\rootprojects\
```

Each project consists on a **single folder** which can be copied, moved or otherwise archived once a project is complete.

Project folders contain the complete project except for the *source* media, *renders/caches*, any *proxies* or *thumbnails*. With the source material placed in the expected location (as per project library), or re-conformed/linked elsewhere, all other media can be regenerated.

The Project Library

5

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The Project Library 5

Keyboard Shortcut : F1

The *Project Library* is used for a wide variety of tasks, including :

- Importing and exporting media
- Creating composition timelines
- Organising media and timelines
- Viewing and modifying metadata
- Managing render tasks
- Creating proxy sources

In **single-screen** mode, the *Library* window replaces the viewer. In **dual-screen** mode, the Library (and **F1**) button toggles display of the *Memories* window.

Library Components

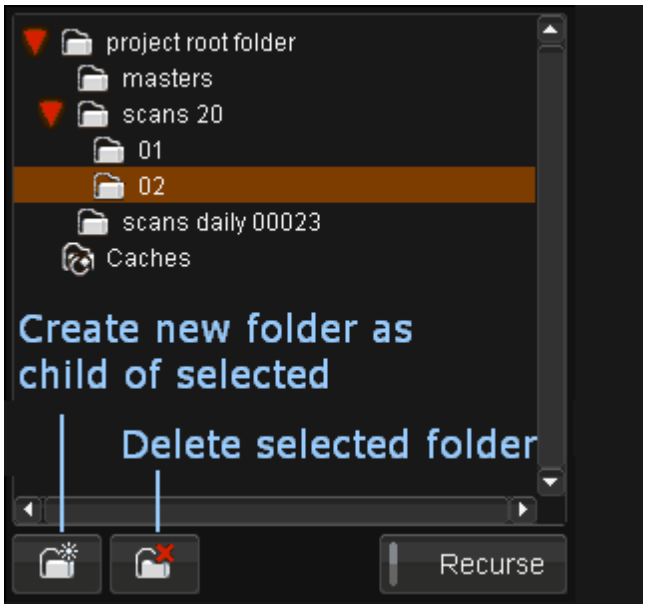
The *Library* is organised around a central tabular display of your media assets, a list of *folders* on the left and a row of function and view filter buttons below.

The main areas are shown below :

Main library components

Folders

To the left of the *Library* is the folder list. This is a tree view of all folders existing in the library. Folders are created underneath the *project root folder*.



The *Caches* folder contains the renders for all project compositions. It cannot be deleted.

Create New Folder

This button creates a new folder. New folders are always created as **children** of the *selected* folder. The selected folder is highlighted in *orange* (e.g. folder "02" above).

Naming Folders

By default, folders are named *new folder*. To rename a folder :

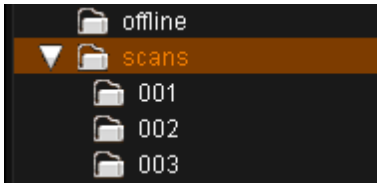
- Select the folder
- Press the **F2** hot key
- Type the folder name

Delete Folder

To delete a folder, select it and press the *delete folder* button.

Recurse

The library only displays the contents of the currently selected folder by default. To display the contents of the current folder and all sub-folders, enable the ***Recurse*** button.

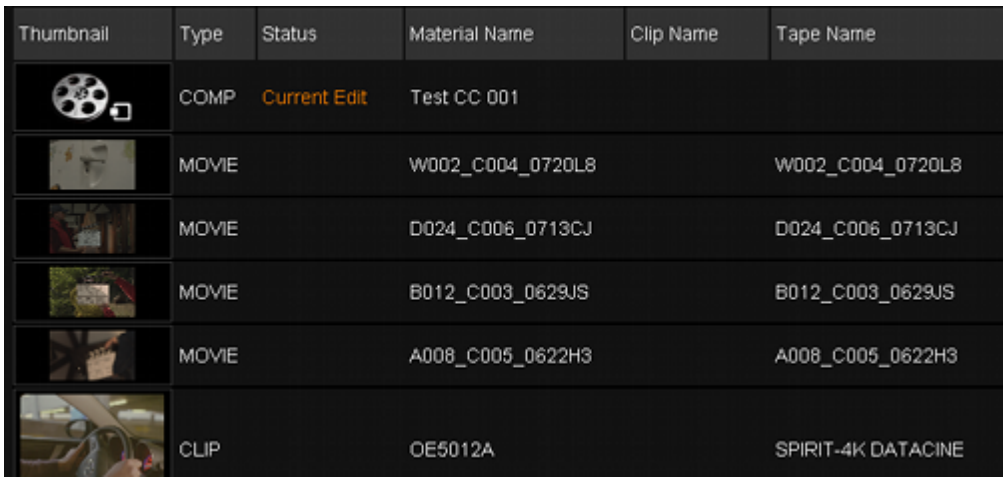


With the ***Recurse*** button **off**, we only see the contents of the *scans* folder. With the ***Recurse*** button **on**, we see the contents of the *scans* folder **and** folders *001*, *002*, *003* etc.

Library Contents

The main library view is located to the right of the folder list and shows the contents of the active (orange) folder.

The contents list is tabular, with each row being a single item (shot, timeline, audio file etc.) and each column being a property of the item.



Library content rows

For more detail on tables and their use, see the Tables section.

Item Types

Each library item has a **type.**

CLIP

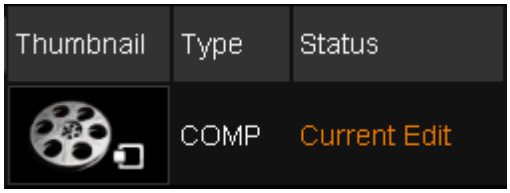
A CLIP is the label for both *image* and *audio* media. For image media, this is source media composed of individual file based frames e.g. DPX or TIFF sequences.

An audio CLIP will have an icon :

COMP

A composition timeline.

The **active** composition is shown with a *Status* property set as *Current Edit* and a COMP icon :



Active composition shown as *Current Edit*.

Editing a Composition

You can set the selected composition active as Current Edit by :

- Double-clicking it or
- Pressing the *Edit* button

The active composition displayed in your timeline will update.

Copying the Composition

You can make a copy of the selected (in orange) composition by pressing the *Copy* button :

The copy will be named using a prefix "Copy of .." and is completely independent of the original (but caches will be shared).

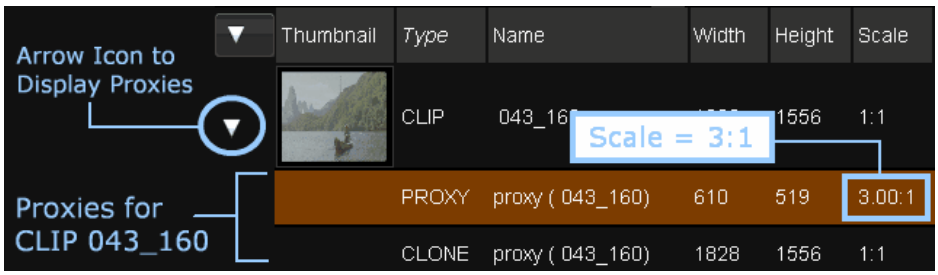
MOVIE

This is source media composed of a movie sequence e.g. Quicktime or Red.

PROXY

A proxy source (or clone).

A proxy source is *grouped* with its corresponding source media. An **arrow** to the left can be expanded to show the proxy or clone.



The proxy scale is shown in the *Scale* property.

Item Deletion

You can delete on or more selected library items by :

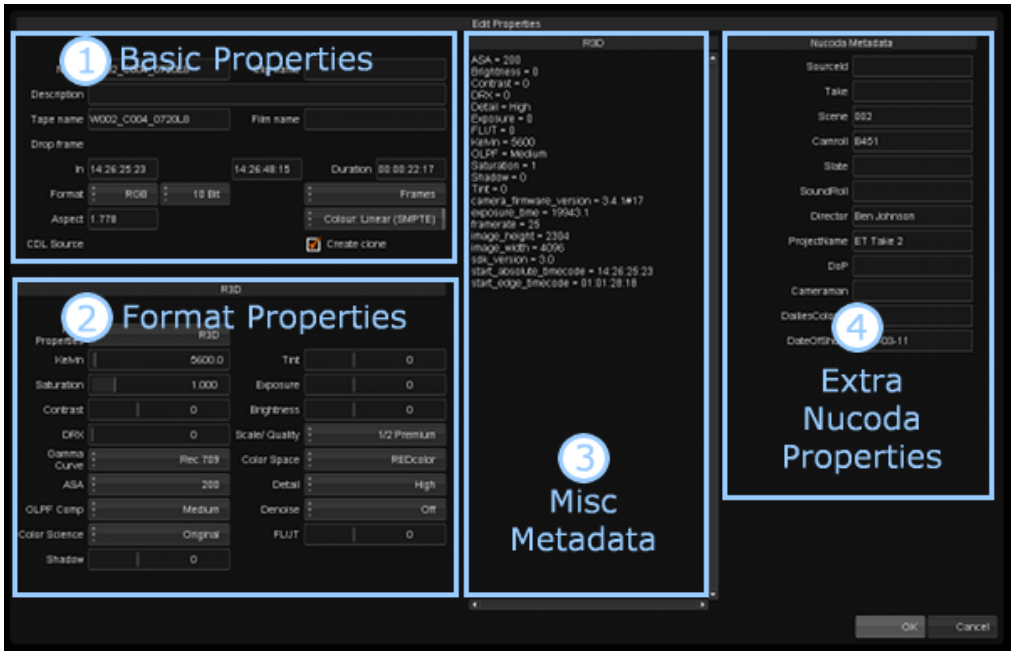
- Pressing the *delete* key on your keyboard or
- Pressing the ***Delete*** button :

Properties and Metadata

Press the *Properties* button to bring up a *property editor* for the selected library items.

The Properties available depend on the selected item.

Most image sequence types have *basic properties*, but many movie formats (such as Red, SI-2K etc.) have extended *format properties* and extra *miscellaneous metadata* associated with them. Audio clips have their own specific audio properties (including *channel routing*).



The layout of the Property dialog

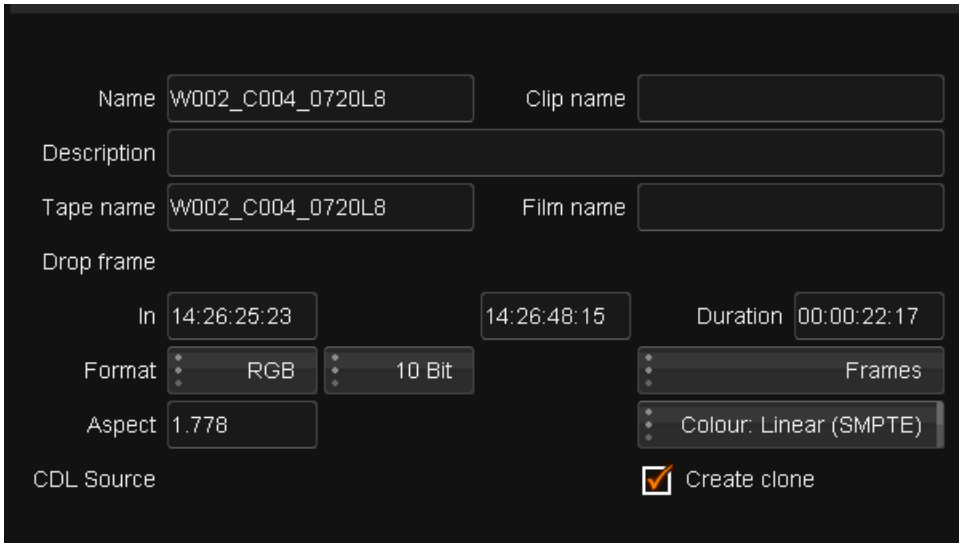
Property Editor Layout

As can be seen in the illustration above, the Property Editor is composed of a number of panels that descrive different aspects of the metadata.

> Not all library items will include all metadata and all the panels.

Basic Properties

Basic Properties are those common to all library types, and include item name, tape name, description, timecode and duration, components and colour space.



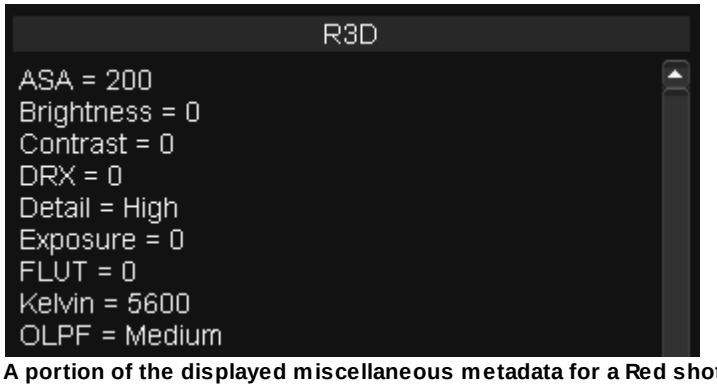
Format Properties

Some items have format specific properties we can edit and these are shown in the *Format Properties* panel. The image below shows the extra properties available for a *Red R3D* shot.

Format Properties panel showing extra properties for a Red Camera shot.

Miscellaneous Metadata

The Miscellaneous Metadata panel shows the extra metadata available. This will be the complete display of all item metadata, some of which will overlap with the *Format Properties* panel.

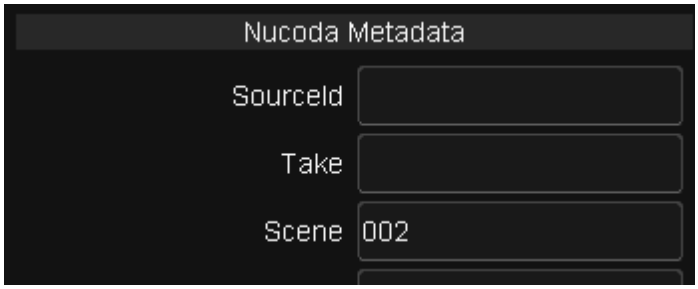


A portion of the displayed miscellaneous metadata for a Red shot.

This metadata is shown as a more *raw form* as found in the original item.

Nucoda Properties

The *Nucoda Properties* are an extra set of metadata fields that can be set on library items.



Nucoda properties (part).

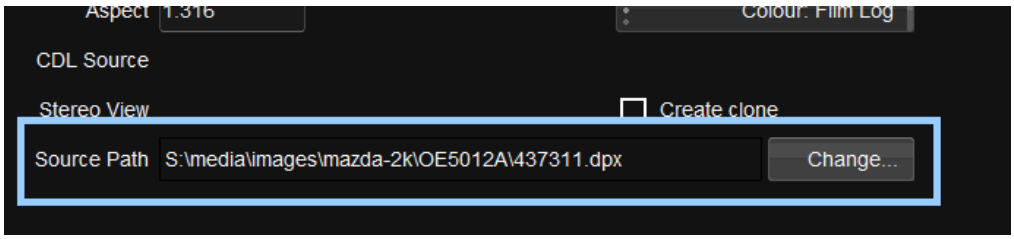
Available properties include : *SourceId, Take, Scene, Camroll, Slate, Soundroll, Director, ProjectName, DoP, Cameraman, DailiesColorist, DateOfShoot*

> These *Nucoda Properties* will be included in any **ALE List** export and facilitate interoperability in a *dailies* environment with products from Avid etc.

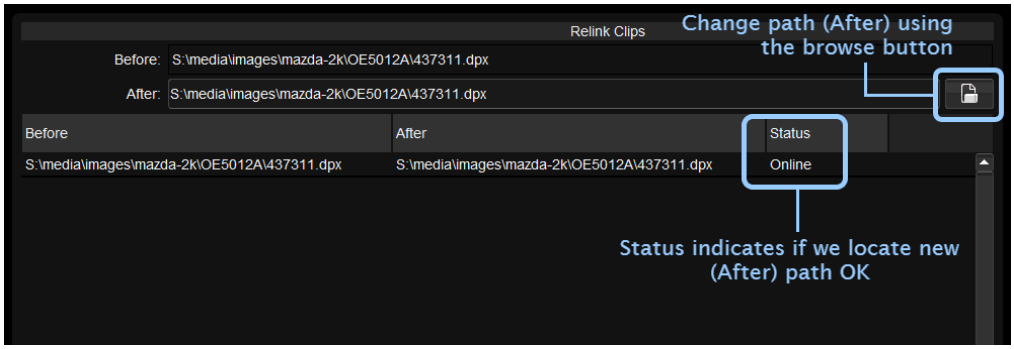
Relinking Clips

The *Relink Clips* dialog allows you to change the *source path* (location on disk) for a clip stored in the library. This can be useful if a clip is *moved* on disk and needs to be re-linked to the composition.

Open the clip *Properties* dialog and select the *..Change* button to the right of the clip *Source Path* property :



The *Relink Clips* dialog opens and displays the *Before* path (current location used) and the *After* path, the new location we can set. Initially they will be the same.

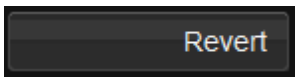


Open the *File Browser* and navigate to the new path required and select the clip located in the new location. The *After* path will update.

The Status indicator will display *Online* if the selected (After) path is good and the clip is located. If we cannot locate the new path, we display *Offline*.

Once complete, press the *Apply* button :

If you want to *undo* your change and revert to the original *After* path, press the *Revert* button :



Library Filters

You can filter the main contents display to show only items matching chosen criteria.

Note that all filters will apply to the contents of the **selected library folder** (and sub-folders if Recurse is enabled).

All

Display all items.

Current

Display the library item that corresponds to the segment under the active play-head.

Marked

Display the library items that correspond to the marked segments.

Unused

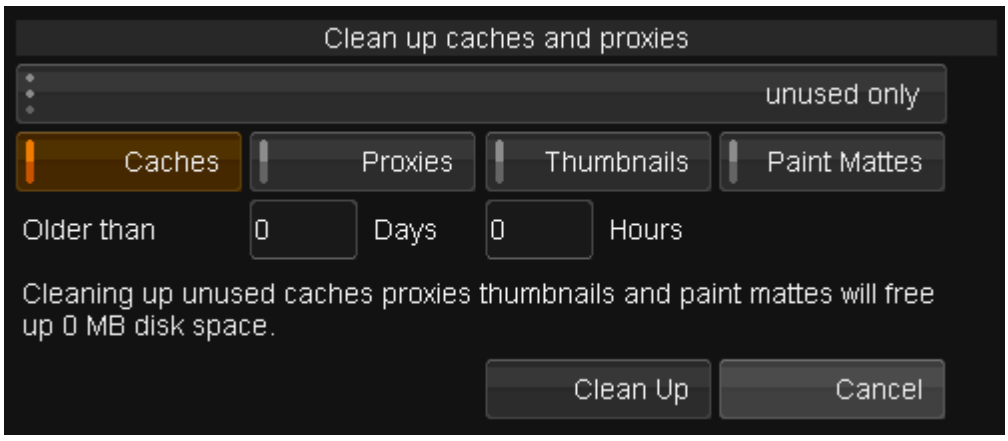
Display the library items that are not in use in the composition or marked region.

Comp / Clip / Proxy

Display compositions / clips / proxies.

Cache Management

The ***Clean Up*** button lets you selectively *purge* unused or unwanted *caches* and *proxies*.



Clean Up dialog

You can choose to delete any combination of caches, proxies, thumbnails and/or paint mattes.

> *Proxies* include any *source caches* (e.g. from MXF). Paint mattes are temporary mattes created using the *Paint* effect or *DVO Fix* paint.

Filters

Select a filter via the drop-down menu :

The filter will operate on all library item types *selected* via the toggle buttons :

Available Filters

unused only

Caches and proxies are deleted if they are not used in *any* composition.

all in project

All caches and proxies in project are deleted.

all in current composition

Caches and proxies are deleted if they are used in **active** composition.

all exclusively in current composition

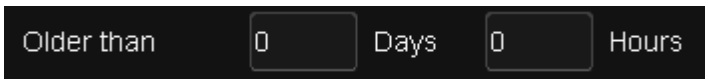
Caches and proxies are deleted if they are **only** used in active composition.

all not in current composition

Caches and proxies are deleted if they are **not used** in active composition.

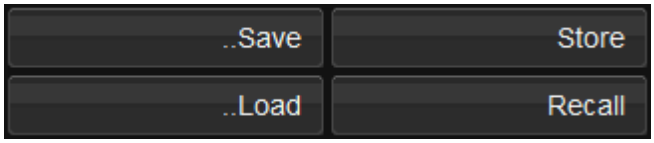
Age Filter

To perform a clean up based on selected item age, use the age boxes :



Items older than the set age will be deleted.

Composition Save and Load



You can use the *Save* and *Load* buttons (and also *Store* and *Recall*, see below) to easily **copy compositions and clips** between projects. We can copy *image* clips, *audio* clips and *compositions*.

The projects can even be on separate computers as long as any selected sequences have the same file paths on each.

If the paths differ, you can change it by editing the clip *Properties* and pressing the *..Change* button to open the Relink Clips dialog.

The *Save* operation (and *Store*, see below) will save all **selected** clips and compositions. If you select a *composition*, we will also save **all clips it references**.

Thumbnail	Material Name	In	Out	Duration
	review 10:30	90000	90880	880
	clip 1	277377	277628	251
	clip 2	362623	362940	317
	clip 3	375300	375558	258
	clip 4	455532	455788	256
	clip 5 red	1443656	1444993	1337

Save will stored selected library items:
Composition "review 10:30" (and everything it references),
plus clips "clip 2" and "clip 3" explicitly.

Any items we *Save* (or *Store*) are copied and the original items are **untouched**. We *Load* (or *Recall*) the copy.

These copies will have the same metadata (*properties*) as the original items and, because these are copies, we can safely change any metadata without affecting the original.

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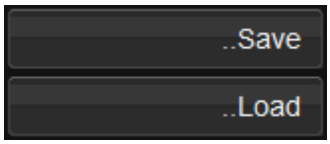
Save / Load



Save

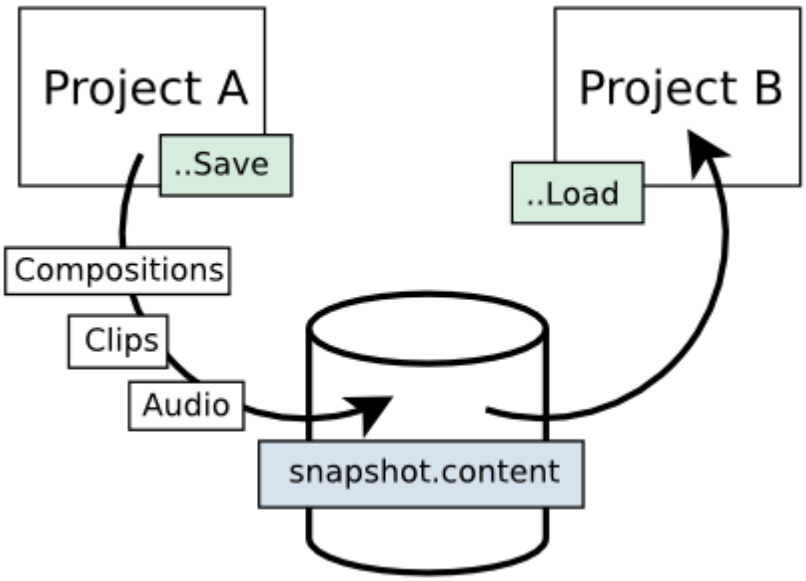
Pressing the *Save* button will open a File Browser dialog and let you choose a path and filename for the saved information. This file will have a `.content` extension added automatically and stores *metadata only*.

> The `.content` file is a text file.

Load

Pressing the *Load* button will open a File Browser dialog and let you select a previously saved content file for loading.

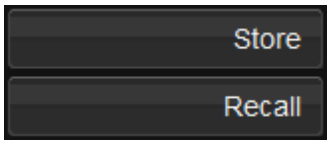
You can load this saved content into *any* project (including the current one) and the result is that a copy of every included clip and composition will be loaded and made available immediately. No conform or re-linking is necessary.



> Only metadata is written out to the content file, no actual image sequence data itself. This metadata includes the *full path* to any sequences stored and these paths can be checked and (if necessary) modified before load in any text editor.

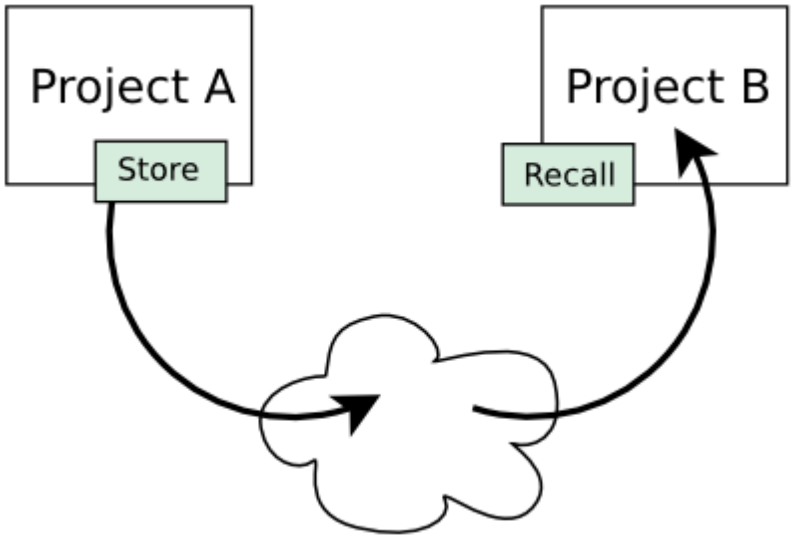
If sequences are *deleted* or *moved* after the paths are stored, then we will fail to locate this media when we load the content.

Store / Recall



Store and *Recall* work exactly like *Load* and *Save* except **no content file is used** (so no *File Browser* prompt).

A *Store* will save the selected compositions and/or clips. A *Recall* operation will recall whatever this stored "snapshot" contains.



The stored content *persists* until the next *Store* operation, even between application restarts.

Store and *Recall* will only work when used with the same version of the application software.

Also see : Command Line Interface chapter.

Importing Material

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Importing Material 6

This chapter describes :

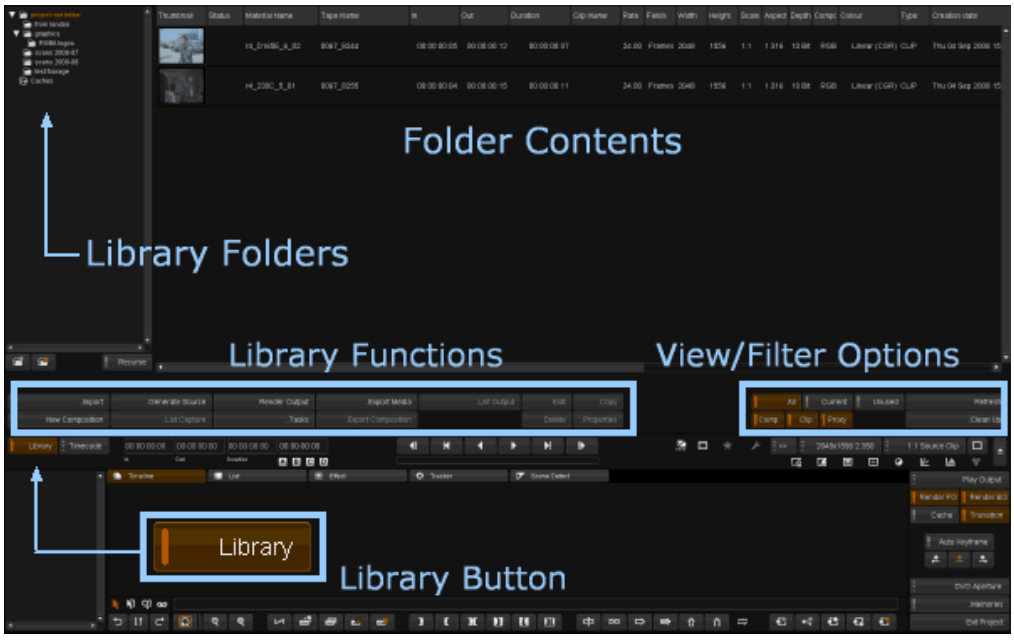
- How to get media (both video and audio) into the project library for use
- How to recursively import entire folders automatically
- How to import and conform from list files (e.g. an EDL)
- How to make sure each piece of media we import has the proper metadata attached
- How to manage our media library

We import material into our project via the *Library*. Switch to the *Library* module via :

- **F1** hotkey or
- ***Library*** button

> Although we talk about *importing* in this chapter, the application **does not move or copy media around**. Unlike some applications that make you import to a proprietary storage volume, we create library **references** to the *original* media files. Importing large sequences is almost instant in most cases.

The *Library Module* will appear over the top part of our desktop :



Project desktop with Library View in upper part.

For a complete description of the *Library* see the Library chapter.

We can get material into the project library in three ways :

- Directly importing media (image or audio)
- Importing material via a *list* (and then doing a *List Capture*)
- Capturing media from a *tape* source - this is covered separately in the VTR section

In the first two cases, you start off by clicking on the ***..Import*** button in the library :

This will launch the file browser and let us browse and load an image sequence or movie, audio or list file.

For supported file formats, see File Format Support.

Importing Media

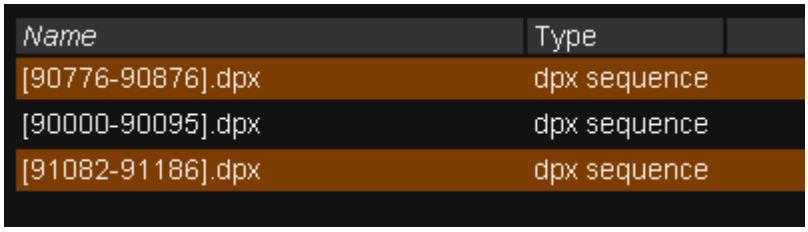
To import material into the project library :

- Press the *Library* ***..Import*** button
- Browse to and select the media to import
- Check your import options
- Press browser ***..Import*** button to do the import

Pressing ***..Import*** in the library opens the *file browser* and allows us to locate and import our source material.

See the File Browser section for detailed instructions on using the browser component.

The file browser collapses *contiguous sequences* into single rows and shows the start and end frames in square brackets :



Select a sequence and press the browser ***Import*** button to import the selection into the library as a shot.

> As shown in the screenshot above, you can import **multiple items** at once by selecting more than one item (e.g. SHIFT+Click or CTRL+Click) and pressing the ***..Import*** button.

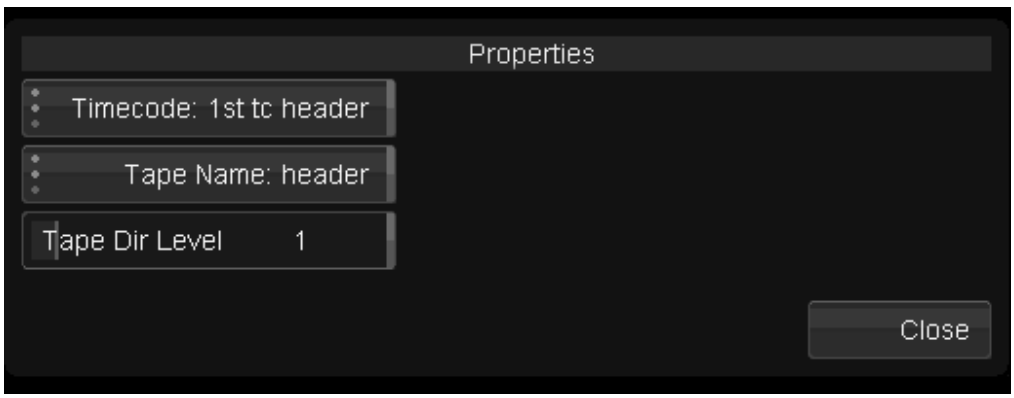
Before doing the import, check your import options (see below).

Once you have finished importing your media, click the ***Close*** button to close the file browser.

Import Options

For image media, the *Import Options* dialog lets us select the method used to extract the **Timecode** and the **Tapename** from the media imported.

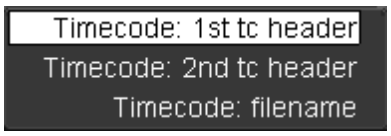
The browser ***..Options*** button will open the import *Properties* dialog :



Set the default settings in the *Application Preferences* Capture/ Conform tab.

It is very important that we ensure (where we can) that we have a proper *tapename* and *timecode* associated with our source media.

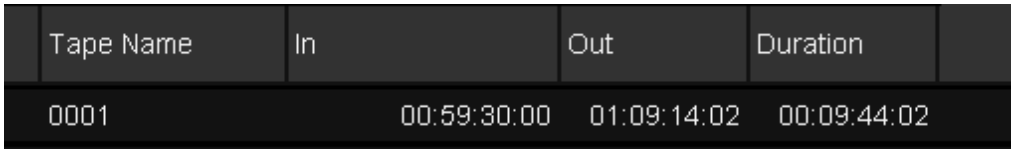
Timecode



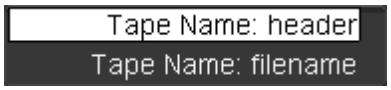
We can extract the **timecode** from the file header (e.g. a DPX format sequence) or from the sequence filename (i.e. sequence numbers are the timecodes).

For *header* timecode, you will always use *1st tc header* unless you have a **Red R3D** sequence and wish to use the *second* R3D timecode (*2nd tc header*). See the Red Support chapter.

The timecode extracted will be placed in the Library *In* column, and will also cause the assignment of the *Out* and *Duration* values.



Tape Name



We can extract the **tapename** from the file :

- **Header** - Some file header metadata contains the *tapename* (e.g. DPX)
- **Filename** - A string component of the file path e.g. file name or containing folder name

Tape Dir Level

The *Tape Dir Level* sets the folder level from which we take extract the *tapename* when extracting the tapename from the *filename*.

- Level 0 is the file name

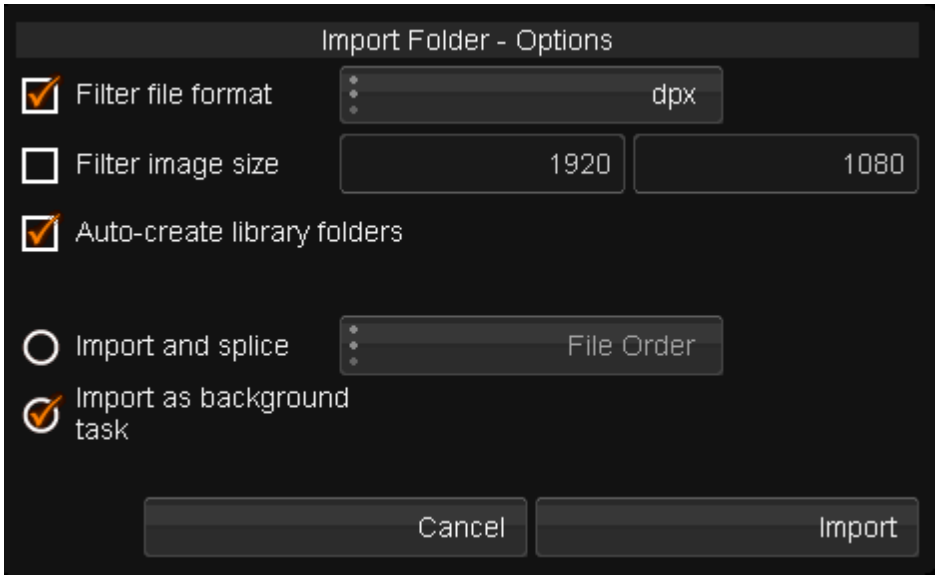
- Level 1 is the containing folder
- Level 2 is one folder up etc.

See the appendix chapter Automatic Naming.

Folder Import

If you select a *folder* and press the ***..Import*** button, the folder contents and all sub-folders are imported *recursively*. We search for *image sequences* and *movies* and import those we find automatically.

The *Import Folder Options* dialog allows us to set some import options, such as filters on image format and resolution, material naming convention and automatic sequence timeline splicing.



Options

Filter file format

Select to import only files of specified file format.

Filter image size

Select to import only files of specified pixel width and height.

Auto create library folders

Select to automatically create library folders for the imported media. Folders are created as per the auto folder settings.

Import and splice

Select this to splice the imported media to the current *composition*

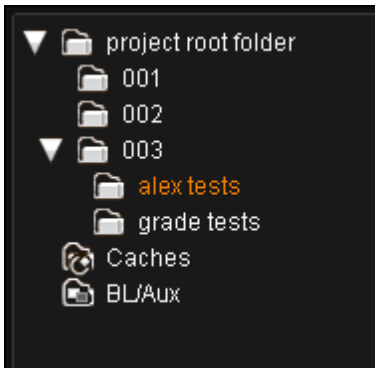
timeline automatically. Choose the desired splice *order* from the drop-down menu :

- File order is the order the file sequences are found.
- Timecode order is the order as per the extracted shot timecodes.

Import as background task

Select to import as a *background task*. After pressing ***Import***, you can close the file browser and the importing will continue in the background.

Library Folders



Media you import is placed inside the currently *selected* library *folder* (shown highlighted in *orange*).

The import process can also create library folders **automatically**, placing each piece of media inside a folder named from the *filename*, *file path* or *tapename* extracted. To configure this, see Automatic Naming in the appendices.

Importing Audio

Import audio material into the library in the same way as image media. In the *Library* module, press the ***..Import*** button, browse to the audio media location and select and import.

The audio formats supported are :

- Wave Audio (.wav) - either 44.1 KHz or 48 KHz 16bit stereo
- Broadcast Wave (.bwf)
- Audio Interchange File Format (.aiff, .aif, .aifc)

The default sample rate is 48KHz.

> The *audio sample rate* is configured in the main preference file *general.prefs* using the `audioSampleRate` parameter. It cannot be configured through the GUI currently.

Importing List Files

Import a *list* into the library in the same way as image media.

In the *Library* module, press the ***..Import*** button, browse to the list file location, select and import.

> In the case of a **list** file, you are creating a *Composition*, not importing shots. Initially, the list created composition will have no media linked to it. To link media to the composition created, see the next section List Capture.

A *list* file is a formatted text file that defines the basic layout of a composition and relates the source media "events" (defining *shots*) to the record timeline locations. The source media is defined by a *tapename* (or reel) and *source timecode*.

The supported list file formats are:

- EDL - **CMX 3600** format
- AAF
- Cut Lists (.ctl, .cut)

> For Cut Lists, the supported formats are as per the example files in folder :
> `C:\Nucoda\2014_1\example_files\`

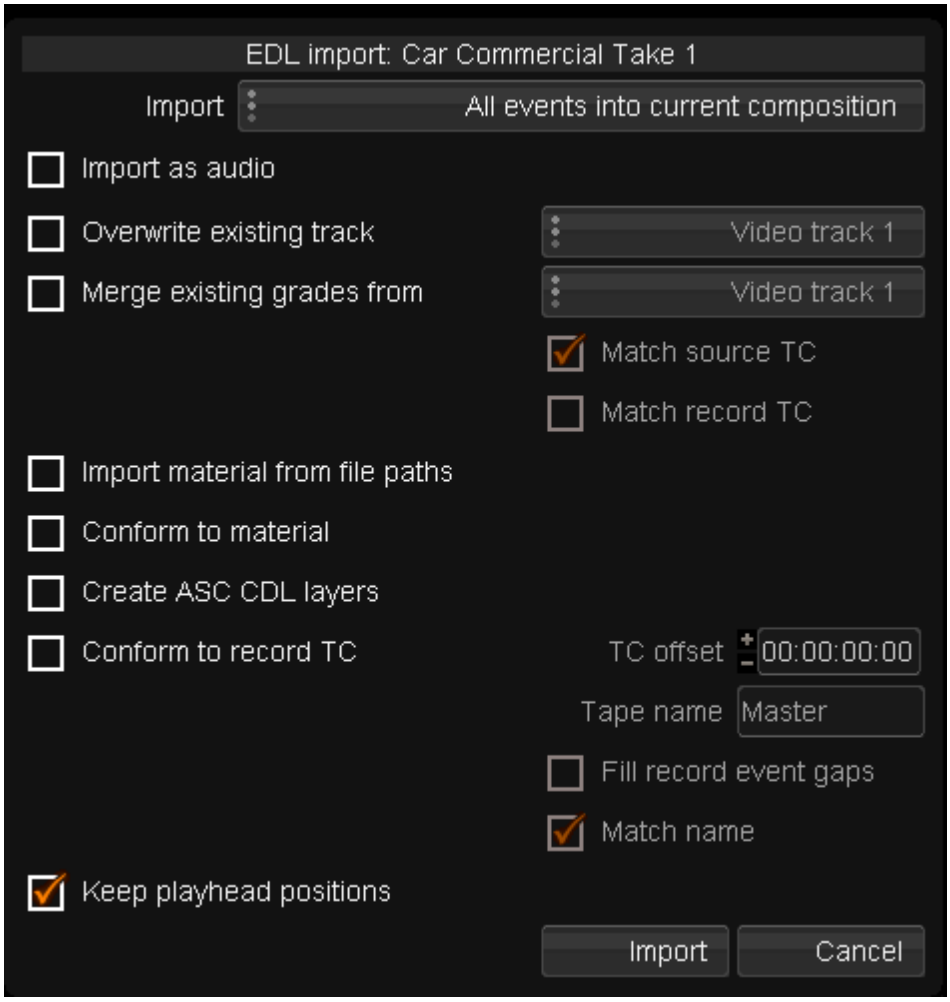
Once the list itself is imported, we will have a new composition. We will then have to *capture* any required media and *conform*. See List Capture.s

> Conforming will "attach" media to the empty composition shots.

List Import Options

When we import a list file, a new dialog opens and lets us set various *import options*. We can decide whether to import the list creating a new composition, merge it into an existing composition, how to merge any existing grades etc.

> **!** Always take a **backup copy** of your composition before modifying it (e.g. by importing a list "into current composition").



List Import options dialog. The dialog title is the list filename.

Each option is described below.

Import Mode

All events as new composition

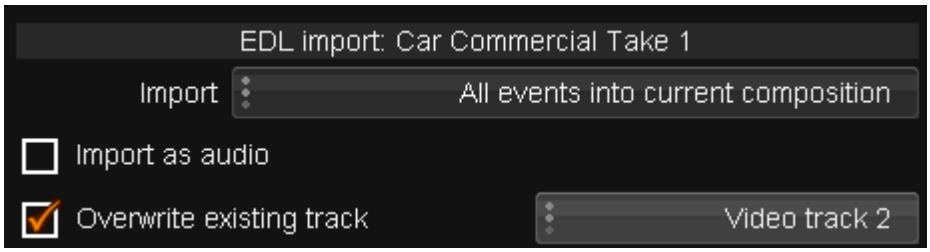
A new composition is created from the list file.

> If the list has a "TITLE:" field, this will become the name (*Material Name* in the Library) of the new composition.

All events into current composition

The list file is added to the active composition on a **new video track**.

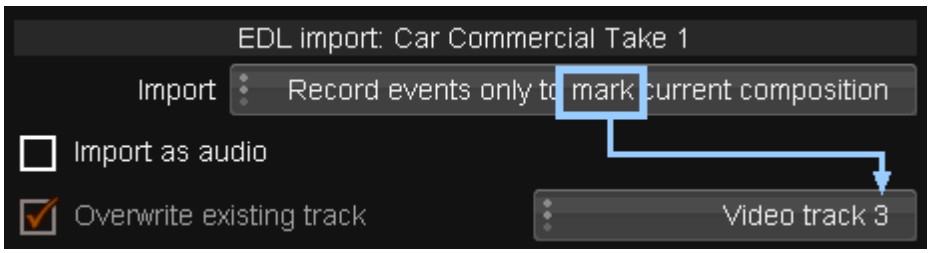
You can also set the imported list events to overwrite a current track by selecting *Overwrite existing track* and selecting the track to overwrite from the drop-down list :



Record events only to mark current composition

The list record events are used to add **cuts only** to the currently active composition.

Use the **track selector** to the right of *Overwrite existing track* to choose which video track to mark :



> Note that the cuts will be scene cuts. See the Compositions chapter.

Import as audio

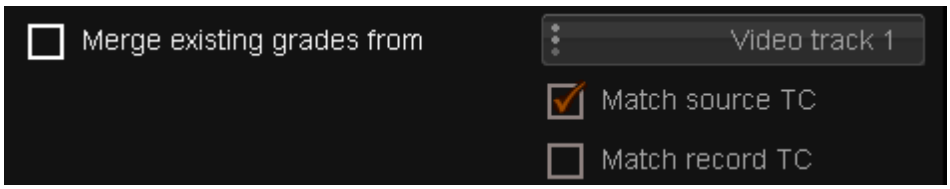
This imports the EDL (a normal video EDL) but creates *audio events* on an *audio track*, not video.

Overwrite existing track

With an active composition, this will cause the new list events to *overwrite* the selected video track.

> The new events from the list will **completely replace** the selected track.

Merge existing grades from



If you have a graded composition, you can choose to merge these grades into the new imported list. You can create a new composition result (*All events as new composition*) or merge the grades into the existing composition (*All events into current composition*).

The grades are taken from the selected video track.

The *Match* options let us choose the criteria used to match each graded shot with the new shot imported with the list.

Match source TC

Use the *source timecode* when determining the matched shots when merging grades.

Match record TC

Use the *record timecode* when determining the matched shots when merging grades.

> You can select **both** *Match source TC* and *Match record TC* to have both tried consecutively.

Import material from file paths

Select this to automatically import media specified in the EDL list file.

The EDL should contain media paths per event in the following format :

```
* FROM FILE: <path>
```

e.g.

```
001 OE5012E  V   C   19:08:57:15 19:08:58:15 01:00:01:00
01:00:02:00
* FROM FILE: S:\media\annotated\4\tc\1723400.dpx
```

Conform to material

If the media is available in the library (perhaps pulled in via *Import material from file paths*), *Conform to material* will try and *conform* (i.e. link) the list events to it.

Create ASC CDL layers

If the EDL list we import includes *ASC Color Decision List* information, selecting this option will create **effect layers** for the shots.

The ASC CDL information includes :

- **ASC SOP** - *Slope Offset Power* values. Encoded as :
  `ASC_SOP (SlopeR SlopeG SlopeB) (OffsetR OffsetG OffsetB) (PowerR PowerG PowerB)`
- **ASC SAT** - *Saturation* value. Encodes as :
  `ASC_SAT Saturation`

e.g.

```
002 A049_C013_0706DS V   C    11:14:16:22 11:14:24:15
01:00:07:22 01:00:15:15
* FROM CLIP NAME:
* FROM FILE: S:\tests\Day-1\A049_C013_0706DS.
RDC\A049_C013_0706DS_001.R3D
* ASC_SOP (1.1029 1.1223 1.1110) (-0.1162 -0.1061 -0.1046)
(0.6293 0.6277 0.6179)
* ASC_SAT 1.2000
```

> **!** Application version 2010.0r1 and before contains a *bug* such that the ASC lines must **not** contain a *space* after the "*" i.e. you must use the syntax `*ASC_SOP` (no space between '*' and 'ASC'). **This issue has since been fixed.**

Conform to record TC

Selecting *Conform to record TC* changes the default conforming behaviour and looks to conform (link) our the available media with the list **record timecodes**.

Normally we *conform* (i.e. link) our media to the event *source* timecode. Conforming to the list event record timecode is often required when our media has already been edited (such that media timecodes are now those for the *record* timeline). This media will usually have a start timecode the same as the first EDL record timecode event.

TC Offset

Set the offset (if any) between the list record timecodes and media we are conforming.

Set *positive* or *negative* offsets via the "+" and "-" buttons.

Tape name

Technically, only the *source events* are associated with a **tape**. You can associate the *record events* with a tape by entering it here. It is good practice to always set a tapename here.

Fill record event gaps

If the record events are not all *contiguous* (timecode) but contain gaps, fill the gaps with *filler*.

Match name

When using *Conform to material* ,ensure we take account of the tapename we have entered in the *Tape name* field.

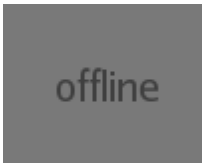
Keep playhead positions

Make sure we do not reset or change the play-head positions.

List Capture

Once you have imported your list file, we have a composition timeline that has no media *linked* to the shots.

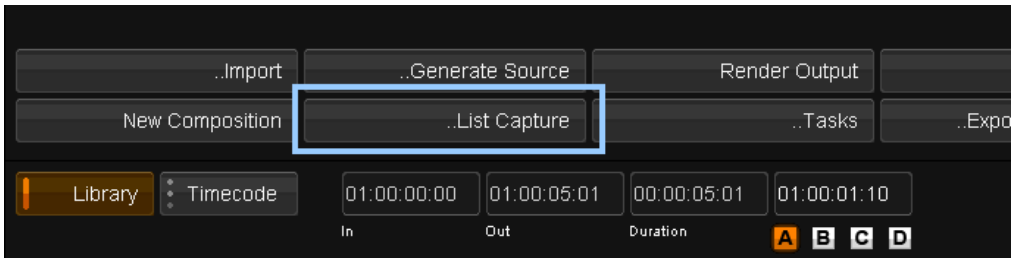
A shot without media *linked* to it will display the *offline* slate in the monitor :



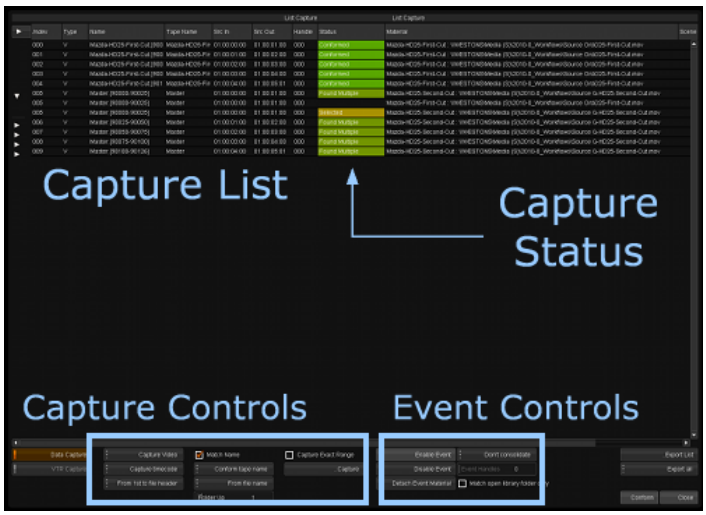
To connect the composition shots to media, we need to :

a) ***capture*** - find the referenced media and import it to the library.
b) ***conform*** - link the matching media to the shots.

We do this via a batch operation called *List Capture*. With the composition active (currently edited) click on the ***..List Capture*** option in the library:



This will bring up the *List Capture* window :



The *List Capture* window displays an alternative view of the composition timeline, showing each shot as a separate row in a table. Each shot will have a *Status*.

You will only see the events listed on ***enabled*** video tracks.

After initial import, the list will not be linked to any media and each list event will have a *Needed* status.

Index	Status	Type	Name	Tape Name	Src In
000	Needed	V	Master.[90000-90025]	Master	01:00:00:00
001	Needed	V	Master.[90025-90050]	Master	01:00:01:00
002	Needed	V	Master.[90050-90075]	Master	01:00:02:00

Each event has a *Needed* status after list import.

Media Event Status

	Src Out	Handle	Status	Materia
00:00	01:00:01:00	000	Conformed	Mazda-
01:00	01:00:02:00	000	Conformed	Mazda-
02:00	01:00:03:00	000	Conformed	Mazda-
00:00	01:00:01:00	000	Needed	
01:00	01:00:02:00	000	Needed	

The shot *Status* field can take the following values :

Status	Meaning
Needed	The media specific to this event is not in the library, or has not been matched to media on disk after searching (*Capture*).
Found	The media specific to this event is in the library and has been matched *exactly* (given capture control criteria).
Found Multiple	The media for this event is in the library but *multiple matches* have been found (given capture control criteria). By default, we select the latest for use but you can choose to change this selection.
Disabled (Needed)	As the *Needed* status, but the event has been *disabled* (so no attempt will be made to find or match it).
Disabled (Found)	As the *Found* status, but the event has been *disabled* (so no attempt will be made to conform/link the event to the media found).
Conformed	The media for this event is found, is in the library and has been *linked* (conformed) to the event.

Capturing Media

After importing our list, we can proceed to *Capture* media into our Library via the ***..Capture*** button.

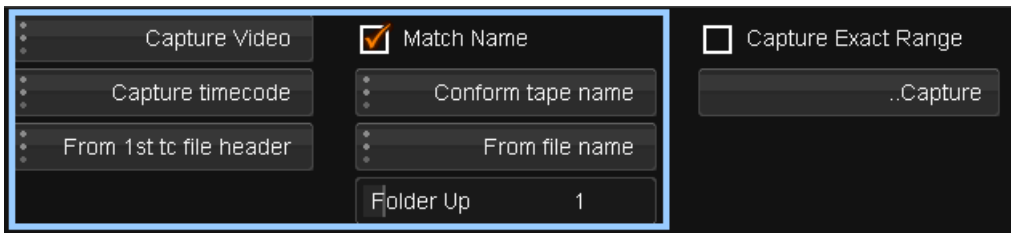
The capture process will examine on-disk file media and compare it with events in our list. Those that match will be loaded into our library and have a status set to *Found*. Matching can be performed on timecode alone, or on timecode and tapename.

Because capture list events are always matched (linked) to material in the project library, if the library contains matching material when the list is imported, the match will be shown immediately in the *Status* field. In this case, the list event *Status* will say ***Found*** for those events we can match.

Capture opens a file browser and we choose a **starting folder** from which to search for media matching our event list. Each piece of media we find has its *timecode* and *tapename* extracted as per the settings we have in the *Capture Controls*. For a discussion of this metadata extraction process, see the Capture/Conform chapter in the appendices.

Capture Controls

The *Capture Controls* set the mechanisms we use for extracting the *timecode* and *tapename* information from material we find on disk.



As we recursively search from the chosen starting folder, the extracted timecode and tapename is compared to each list event and if we find a match, we change the matched event status from *Needed* to *Found*.

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Any matching material is *loaded* into the library, but not yet linked (*conformed*) to the event.

Match Name

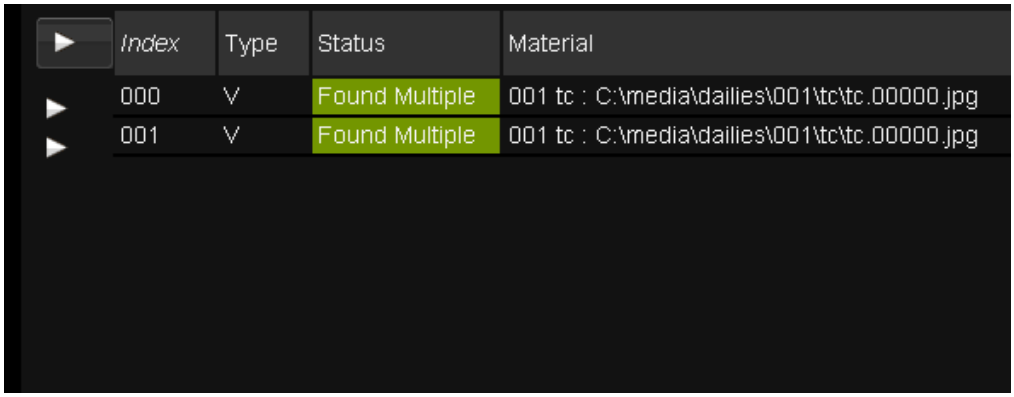
If *Match Name* is enabled, the *tapename* is used when testing for a match. With *Match Name* disabled, only timecode will be used.

Multiple Matches

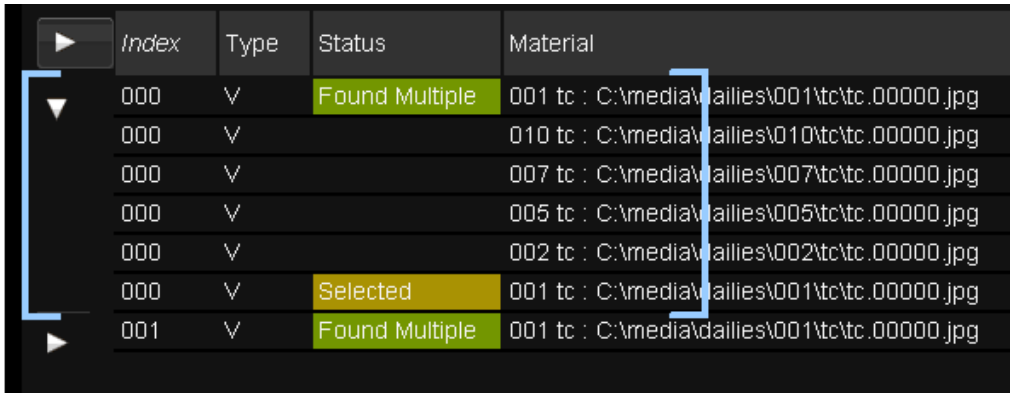
Sometimes, we find more than one item of media on disk that matches a shot in the capture list.

When this happens, the *Status* is displayed as *Found Multiple* and an arrow is displayed to the left of the list item. You can select the arrow to open up the rows and view all the matches.

The **most recent** event is selected by default.

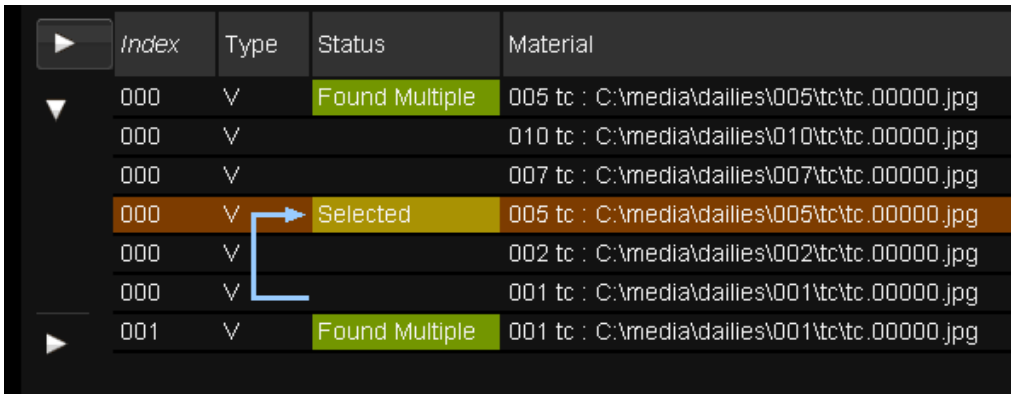


Both shot index 000 and 001 have been matched to multiple media items.

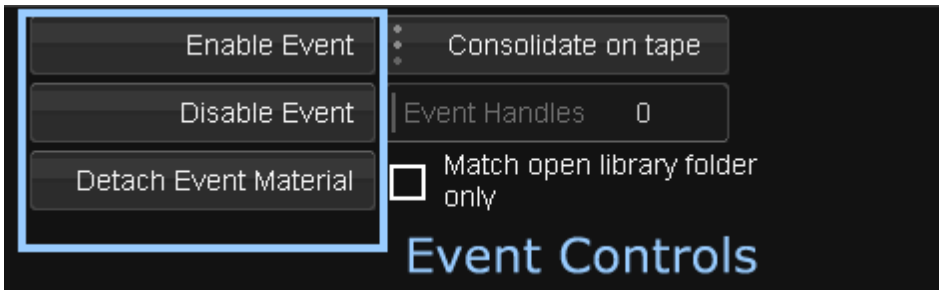


Opening shot 001 to see what media we have matched. Note we matched 5 media items and have selected the latest.

If you want to change the selected match, highlight your choice in the list and press the ***Enable Event*** button in the *Event Controls* (see below) :



Event Controls



Use the *Event Controls* to :

- Switch the selected event when multiple matches occur.
- Disable events to prevent them being conformed or found.

Disable/Enable Event

When you *Disable* an event, you prevent it changing status such that :

- A *Found* event will **not conform** (link) to material when pressing *Conform* (it will stay *Found*)
- A *Needed* event will **not be found** (it will stay *Needed*)

> The *Disabled* state of an event is **reset** if you close and re-enter the List Capture module.

Enable Event will reverse the disabled state and allow the event to take part in capture and conform operations once again.

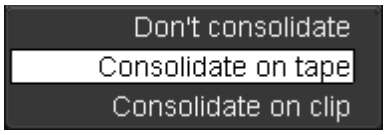
Detach Event Material

Detach Event Material will unlink the selected events from their conformed media and change their status from *Conformed* to *Found*. The media itself remains loaded in the library but the affected events (shots) will go *offline* because the link to their media has been broken (they become un-conformed).

Match Open Folder

If *Match open library folder only* is selected, we will **restrict** the media we try and conform (link) to that inside the currently open library folder.

Consolidation



Default : Consolidate on tape

Consolidation is the grouping together of *overlapping* events (generally by timecode) into a single "event" which can be processed (captured) as one. This can minimise the amount of work required to capture the same amount of material. Consolidation reduces the total number of events to capture.

Don't consolidate	Ignore potential consolidation and show every event in the list.
Consolidate on tape	Consolidate overlapping timecodes within the same tape.
Consolidate on clip	Consolidate overlapping timecodes within the same clip.

Without *consolidation*, a composition that uses the same media more than once, each time using a different set of frames, will appear in the composition capture list multiple times.

Conforming the List

Conforming will link the *Found* events in your capture list to specific media matched and loaded into the project library. Once conformed, the status of the event changes to *Conformed* and can be considered *locked* (to the specified material).

The event can be considered locked because a *re-conform* (pressing the *Conform* button in the *List Capture* module) will never detach or attach different media. To **un-lock** the event, and break the link between the event and its media, use the *Detach Event Material* button (the event will revert to the *Found* state).

Once conformed, you can close the *List Capture* module and return to the project desktop.

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Compositions

7

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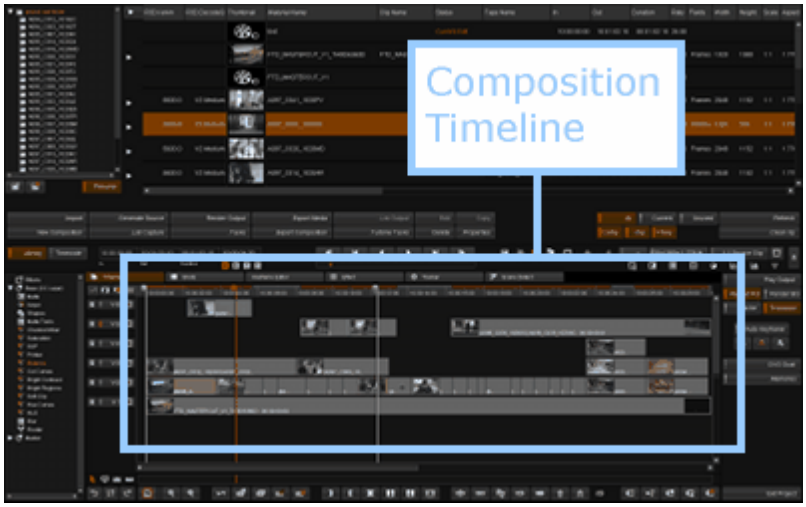
Compositions 7

A *composition* can be considered a container within which you *compose* your work. A project can contain an unlimited number of compositions, each of which can contain any number of video and audio tracks and their media segments.

Compositions consists of :

- Video and audio tracks to arrange your media
- Bookmarks
- Edits and transitions
- Shot versions
- Any grading and effects on the shots of tracks
- Play-heads and marks

The composition is the basic building block of any creative work you do.



Composition item in library selected and composition timeline below

Creating Compositions

You can create a composition manually, or by importing a supported list file (e.g. EDL) or an AAF file.

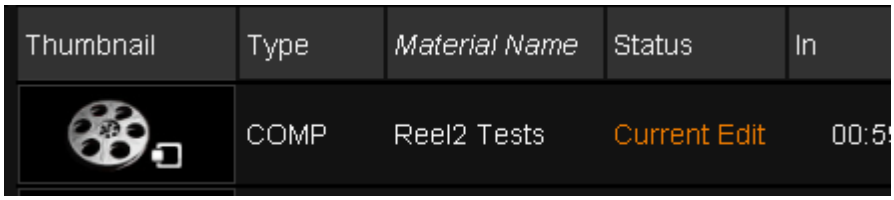
Manual Creation

To manually create a composition, press the *New Composition* button in the *Library* screen :

This will close any open composition, create and open a new one. The new composition will be named *Untitled* by default but you can name it via the .. *Properties* dialog window or by double-clicking the *Material Name* field and typing a new name :

Renaming a composition manually by typing in new *Material Name*

The currently viewed (edited) composition has status *Current Edit* in the library.



The frame rate of the composition is set on creation to the project master format rate.

List Import and Capture

Importing an EDL, AAF or other supported list format will create a new composition with video and audio tracks, media segments and supported effects (e.g. retimes) as per the imported list. For an Avid AAF/MXF workflow, see the Avid Integration chapter.

With an EDL, the composition will be named as per the "TITLE" field. Media segments will need to be *conformed* to the timeline.

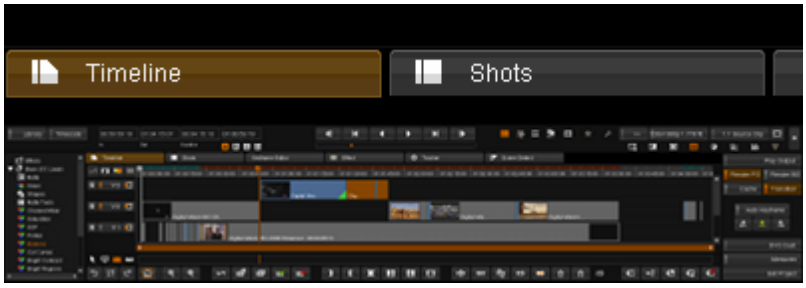
A composition will also be automatically created when you capture media from a VTR device.

Composition Elements

The main element of a composition is the *timeline*.

This view is where you can arrange your *media segments*, *edit* segments, add *effects* and control what is displayed in the monitor. This is the default view for a composition and shows you :

- Video and audio tracks
- Media segments
- Play-heads and position indicators
- Timeline marks
- Bookmarks



Video and Audio Tracks

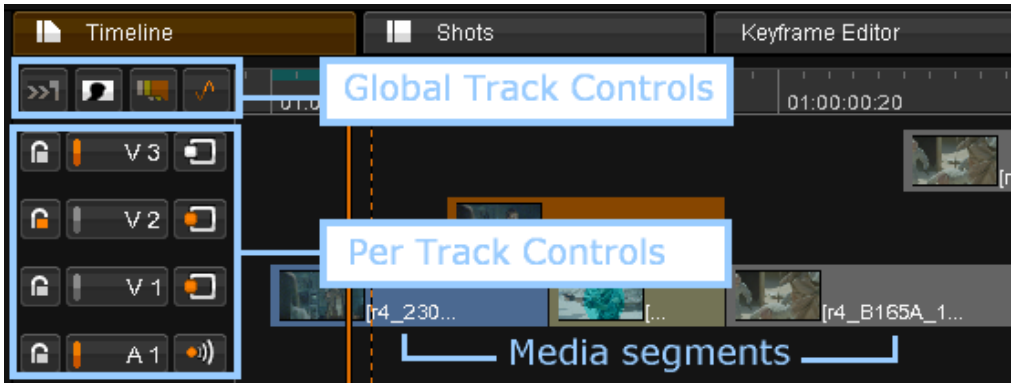
Video and audio tracks are laid out in horizontal strips in the classic way. An *empty* composition defaults to one video and one audio track. The monitor will display a *mixed-down view* of your timeline.

A *mixed-down view* is the view you see as if viewing the composition from **above**, taking track output *visibility* into account.

A composition is composed of one or more media tracks (image or audio) stacked on top of each other in rows.

Each track has :

- *Per track*, *independent controls* on the left and
- *Global track controls* above these



Per Track Controls

Per track, a set of track indicators on the left :

Enabling a Track

The track enable button allows you to **select** one or more tracks to operate on i.e.

- Delete
- Splice or overwrite media
- Push up or down etc.

Disabled tracks are still *exported* (to file or tape).

Locking a Track

Locking a track will prevent any **edit changes** i.e.

- Edits/cuts
- Trimming
- Moving segments
- Track or segment insertion or deletion etc.

A locked track can still have the **grade** changed.

Track Picture and Sound Output

Toggle the timeline monitor *picture* and *audio* output via the toggle buttons.

> Tracks with output turned *off* are **not exported** (to tape or file).

Global Track Controls

Globally, you can also set the display of track *thumbnails*, *play-heads*, audio *waveform* and set the *active play-head* position to centred during play-back :

Icon	Description
	Centre active play head when playing composition.
	Toggle display of composition segment thumbnails.
	Toggle display of non-active play heads.
	Toggle display of audio waveform inside audio segments. See Audio Segments.

In *Shots View* mode, the centre active play-head button is removed and the audio waveform button replaced with a button to toggle display of *effects layers*. See the section Shots View.

Creating and Deleting Tracks

Use the toolbar buttons to add or delete video and audio tracks.

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Icon	Description
	Create a new video track
	Create a new audio track
	Push selected tracks up a level
	Push selected tracks down a level
	Delete selected tracks

You cannot delete a *locked* track.

Media Segments

Media segments are displayed on the timeline with head and tail thumbnails.

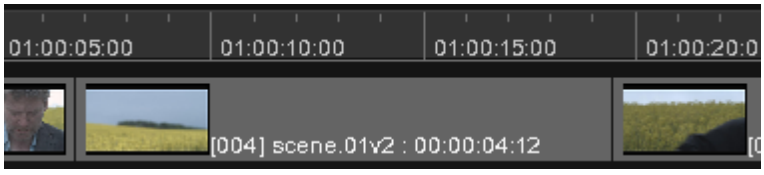
You can toggle the display of thumbnails using the button. See previous section above.

Each media segment on a video track displays the *tape name*, *material name* and any *source offset* (head handles). The *source offset* is given as a *timecode*.

The segment in the diagram above has four seconds and twelve frames of handles at the front of the segment.

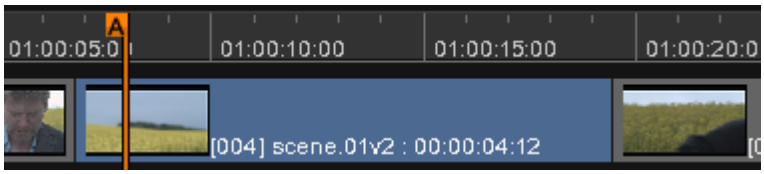
Composition segments are *colour-coded*.

Normal Segment



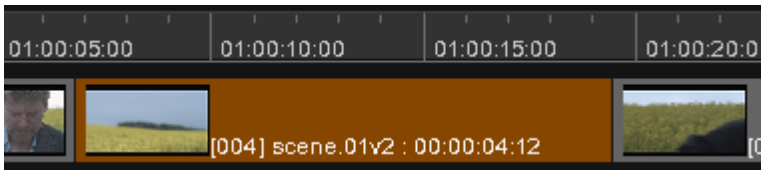
Segments are displayed in grey.

Active Segment



The active segment lies under the currently *active play-head* and is displayed in blue. Grades, effects, versions etc. are applied to the active segment unless some other segment is selected.

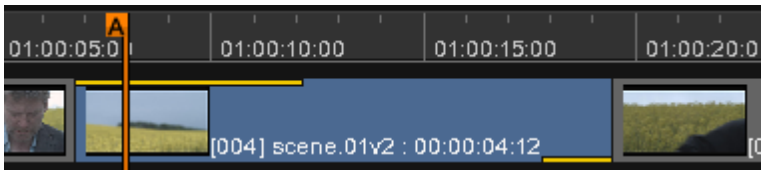
Selected Segment



A selected segment will be displayed in orange. Any selected segments will take priority over the active segment.

When one or more segments are selected, your composition *timeline scroll-bar* will also turn **orange** to indicate this. This is visible even if the selected segment is off-screen.

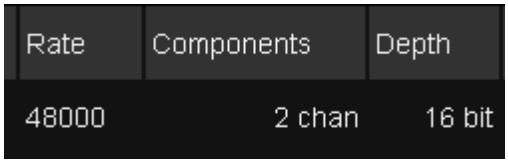
Segment Showing Handles



Head and tail handles are shown as yellow bars, indicating the amount of handles available.

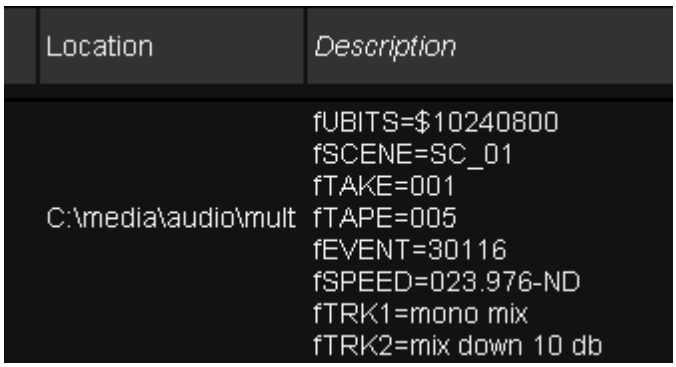
Audio Segments

Audio segments are displayed on the timeline on audio tracks A1, A2 etc. The library will display the metadata for each audio segment :



Components :	Number of audio channels in file e.g. 2 chan
Depth :	Sample bit depth e.g. 16 bits
Rate :	Sample rate in Hz e.g. 48000

If the audio file has *extra* metadata available, it will be displayed in the *Description* column :



Audio Waveforms

The *audio display* button toggles the display of the audio waveform. The waveform is overlaid on the audio segments and the output display monitor.

On the timeline segment, the audio *channels* are shown stacked on top of each other, as shown below.

Audio track with 5 channels as segment waveform

Audio Properties

To view and modify the audio metadata and properties, **select** the audio clip in the *Library* and press the ***Properties*** button. The audio clip properties window will open. This lets you view and modify metadata such as the audio clip *name* and *description*.

Audio clip property dialog, including audio patching interface

Audio Channel Patching

Patching describes the method of switching (and/or affecting) audio signal routing between input and output audio channels. For example, you may want to mute an audio channel, or route the signal in channel 2 to output channel 1.

There are two places in the application that allow audio patching :

1. On an **audio clip** (file)
2. On a **composition timeline**

Adjusting the audio patching on an **audio clip** is *specific* to this clip only. Adjusting the audio patching on a **composition** is *global*, and affects the entire composition.

Audio Clip Patching

The properties dialog for an audio clip includes an *audio patch panel* section.

Audio clip properties dialog and patch panel.

The audio clip channels (***In***) are labelled C1, C2, C3 etc., up to a maximum of eight channels. On import, available audio channels are *un-muted* by default and routed (patched) to the corresponding ***Out*** channel (i.e. In(C1) to Out(C1) etc.).

Modify the patching of each channel via the *In* channel drop-down menus :

Composition Audio Patching

You can view and change the audio patching for the entire timeline via the composition ***Properties*** button in the *Library*.

The audio patching interface is similar to the interface used for an audio clip (detailed above). However, extra selectors are available for choosing channels from any particular audio track on the composition.

Audio patching in the properties for a composition

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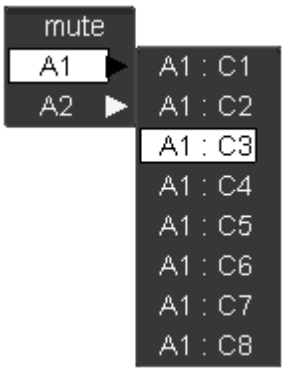
The available audio channels for the composition are in the ***In*** column and labelled :

- Track : Channel

e.g. "A1:C2" is Audio Track A1, Channel 2.

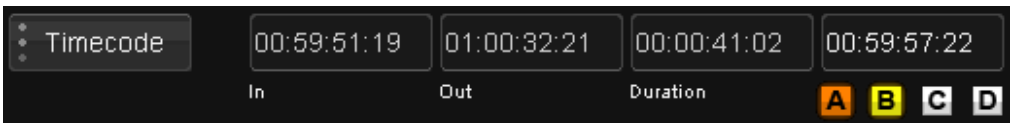
The menu selector drop-down lists allow patching the available *input* track and channel to an *output* channel :



Composition audio patching - input selection.

Positions and Lengths

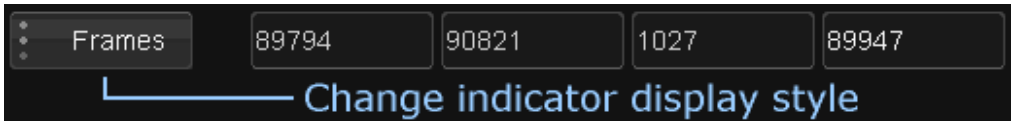
Four position position and length indicators are displayed to the right of a display format specification button :



- **In** point
  This will be the location of any *Mark In* point, or the composition *start* if no mark in is set.
- **Out** point
  This will be the location of any *Mark Out* point, or the composition *end* if no mark out is set.
- **Duration** In to Out
  This will be the *composition duration* if no marks are set.
- **Active play-head** position
  Play-head selector and indicator buttons are shown below the location of the active play-head. The active play-head is shown in *orange*, the secondary in *yellow.*

Timecode versus Frames

You can choose to display fields as *timecodes* or *frames* via the drop-down button to the left of the indicator boxes :



Play Heads

Every composition includes four independent play-heads labelled A, B, C and D. There is an *active* play-head, a *secondary* (last-active) play-head and two *auxiliary* play-heads. Multiple play-heads can be used for shot comparison operations.

Icon	Description
	The A play-head. Yellow means it is the *secondary* head (last active).
	The B play-head. Orange means it is the current *active* head.
	The C play-head.
	The D play-head.

You can switch between play-heads using the play-head selectors :

The selected play-head will become *active* (orange) and the timeline will centre itself on the active play-head. The colour of the indicator buttons update to reflect the play-head status.

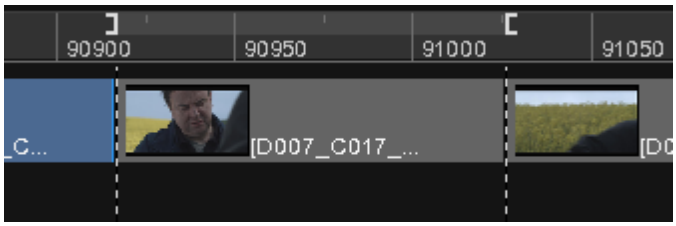
Timeline Marks

You can add *marks* to a composition timeline in order to operate on specific regions only :

- Delete only a marked region

- Limit clip insertion to a marked region
- Playback only a marked region etc.

Starting marks are called *In* marks, ending marks are called *Out* marks. The timeline position indicators will reflect any marks set on the timeline.



Mark In and Out set with dotted line indicators.

Icon	Hotkey	Description
	i	Set mark in
	o	Set mark out
	p	Set mark in to out (mark segment)
	CTRL +i	Clear mark in
	CTRL +o	Clear mark out
	CTRL +p	Clear mark in to out (un-mark segment)

Bookmarks

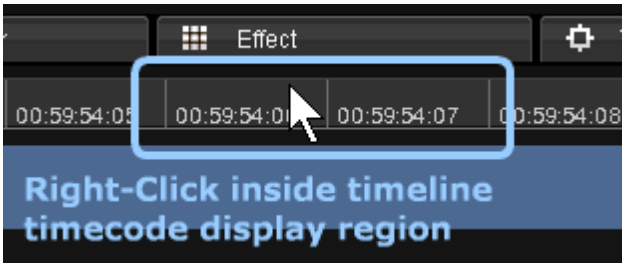
Bookmarks are tags you attach to either an absolute timeline *position* or to individual *segments*. These bookmarks are useful for taking notes for future reference.

Creating a Bookmark

There are two types of bookmarks - *timeline* and *segment*. To create a bookmark of either type at the active play-head position, open the bookmark dialog :

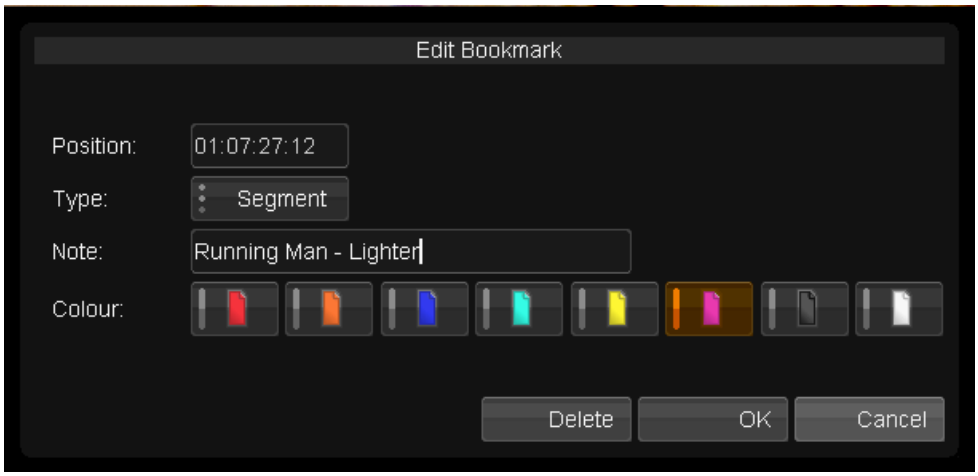
Keyboard : CTRL + m
Panel : CTRL + Book M

Mouse :
You can also use the mouse *Right-Click* on the timeline timecode row at the top of the composition :



Right Click to open Add Bookmark dialog

The bookmark dialog window opens :



Add Bookmark dialog

- The *Type* drop-down list lets you select a *segment* or *timeline* bookmark (see below).
- Add your descriptive text to the *Note* field.
- Choose a colour for t he bookmark.
- Then press the *Create* button to create the bookmark.

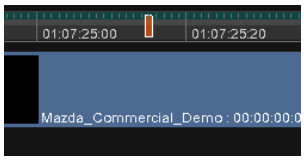
Valhall Control Panel

If you are using the panel you can use **ENTER** to add a bookmark or use the the **QUICKNOTES** buttons 1-8 to add bookmarks of differing colours.

The panel also allows the addition of bookmarks on the fly during play out. They will update on the timeline once you stop playback. However, note that you cannot change between Timeline and Segment bookmarks while playing back.

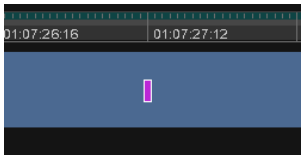
Timeline Bookmark

A timeline bookmark is attached to a specific timecode on the composition timeline itself and stays in the same place on the timeline. A timeline bookmark is displayed above the timeline.



Segment Bookmark

A segment bookmark is attached to a specific segment and moves *with* the segment. A segment bookmark is displayed within the segment.

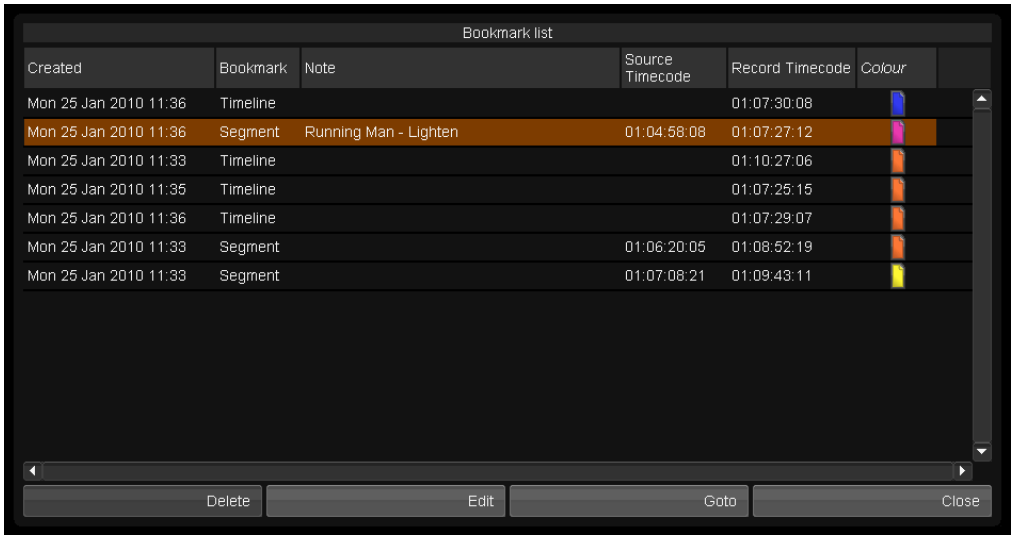


Listing and Editing Bookmarks

To list your bookmarks, press :

Keyboard : m
Panel : Book M

A window opens and displays all bookmarks created on the current composition with their types.



You can select a bookmark and edit it, delete or cue to the bookmark location.

Valhall Control Panel

Use the **UP/DOWN** arrows to navigate and **ENTER** to cue to the selected bookmark.

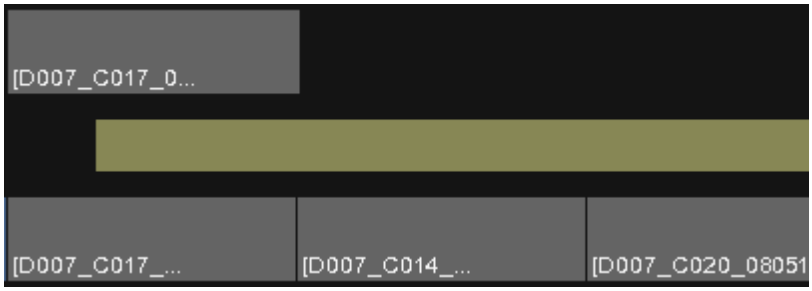
Exporting Bookmarks

You can **export** timeline bookmarks (not segment) using a utility tool called *Bookmarks Assistant* supplied with the distribution. This is documented in the *Bookmarks Assistant* appendix.

Adjustment Segments

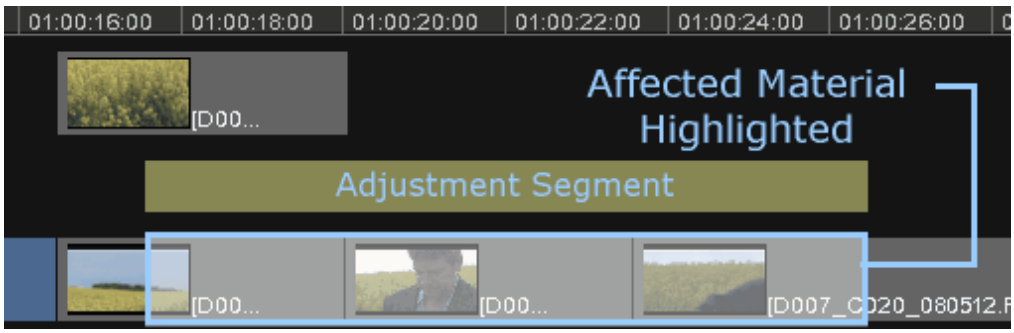
An *adjustment segment* is a special kind of segment we can create that has no associated material. This type of segment is "transparent" and any effects we apply to it will be applied to the material we cover on (visible) tracks *below*.

An adjustment segment is narrower than a normal segment and by default drawn in a *grey-green* colour :



The adjustment segment (middle) is narrow and a different colour. If active, it will be shown in the usual blue colour.

Effects you apply are only applied to covered segments on tracks below.



An adjustment track and the material it can affect on the track below. Note that an adjustment segment has no thumbnails.

Adjustment segments are useful for *adjusting* a group of shots the same way. You can apply any number of effects to the segment in the normal way.

Creating an Adjustment Segment

To create an adjustment segment, use *marks* to select the timeline area for the segment and then use *splice* or *overwrite* with no library material selected :

- Set a *Mark In* mark
- Set a *Mark Out* mark
- Press **SHIFT + v** (*splice*) or **SHIFT + b** (*overwrite*)

Segment Status Colours

Various colour codes are used to identify the *cache and render status* of timeline segments.

The colours shown below are the defaults. They can be changed by editing the preference file *colour.prefs* in the folder :

C:\Nucoda\2014_1\root

Cached and Rendered

We mention two types of frames below : *cached* frames and *rendered* frames.

Cached

A *cache* (also known as *source cache*) is a source sequence that has been cached to our internal format (currently DPX except for float/half float sources). It may be a full size *clone* (e.g. 1:1 Source Clone, or from R3D, Quicktime or MXF) or a source *proxy* at 2:1, 3:1 etc.
These caches have no effects applied.

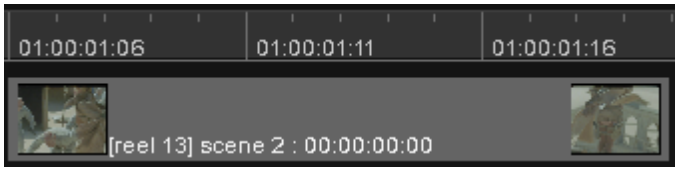
Rendered

A *rendered cache* is a sequence that has one or more effects applied and has to be rendered.

Colour Coding

Normal

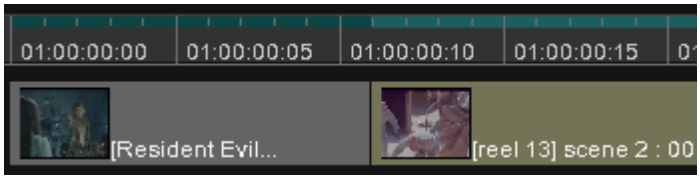
N/A



No processing required.

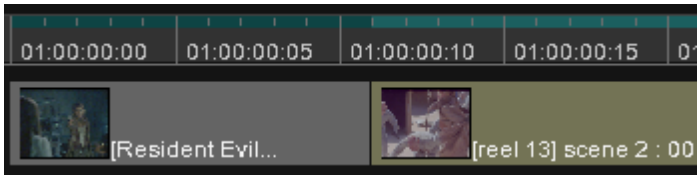
No timeline colour means the segment requires no rendering e.g. no applied effects or no source caching/generation needed.

Cached



The **first** segment above has been *cached* (and note it has no applied effects). This segment may be a cached MXF source (or some other cacheable media) or a generated *proxy* (2:1, 3:1 etc.) and is shown in dark green.

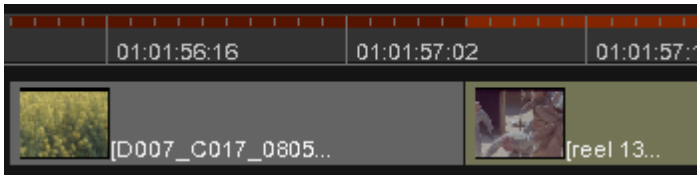
Rendered



The **second** segment has been *rendered* (i.e. it has an applied effect) and is shown in lighter-green.

Note also that the second segment has a lighter colour indicative of an applied effect.

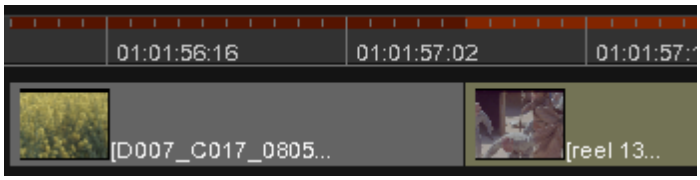
Uncached



The **first** segment needs caching.

This segment may be an MXF source (or other cacheable media) or an ungenerated proxy and is shown in dark red. It has no applied effects.

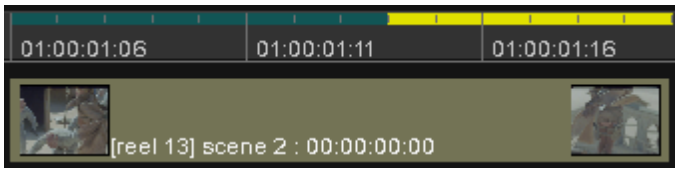
Unrendered



The **second** segment needs rendering.

This segment has an applied effect and requires rendering. It is shown in a lighter red.

Caches Missing

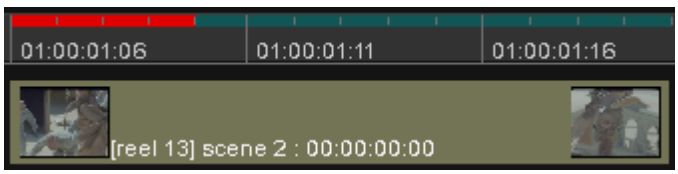


Segment has *missing* caches.

Missing caches are shown in yellow. You will be prompted to fix these (which will render them).

Caches Fragmented

Segment has *fragmented* caches.



Fragmented caches are shown in bright red. You will be prompted to fix these (which will re-render them).

BL and AUX Segments

BL and AUX segments will conform automatically via an EDL. You can also

manually splice BL or AUX segments using the keyboard :

- **BL**
  SHIFT + CTRL + b (or **v**)
- **AUX**
  CTRL + ALT + b (or **v**)

The actual black-level value used by BL will be taken from the project setting.

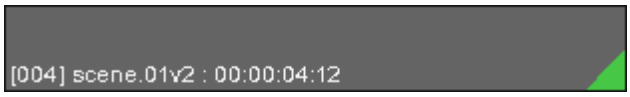
The AUX colour will be taken from the general.prefs preference file and will be set once on project creation.

The *general.prefs* setting for AUX colour is `auxColour` and defaults to *black*. Parameters are given for red, green and blue where values are 0.0 to 1.0.

BL and AUX segments are **never** *active* (blue). As a result of this, you cannot *start* a *colour dynamic* on these segments, only *end* on one.

Grouped Shots

You can *group* segments together and apply your grade to the group rather than to each shot individually. A shot that is part of a group (and when that group is current) is shown with a *green triangle* at the end of the segment.



Segment is part of a group

If segment thumbnails are enabled, the thumbnail will cover part of the triangle.

Manipulating Compositions

Timeline editing tools are found on the *timeline toolbar* at the bottom of the main screen :

You may need to change from the effects to the editing toolbar using the *switch* button :

The following sections relate to both *video* and *audio* material.

Adding Media

You can manually add shots to the composition timeline by using *drag and drop* from the library or by using the *splice* or *overwrite* tools (from the keyboard or GUI buttons).

Clip insertion will obey the current ripple mode and will be inserted at either :

a) The active *play-head* position or
b) Any *Mark In* location set.

Splice

Hotkey : v

The splice operation is non-destructive, and any clip segments that already exist on the timeline will be shifted along by the length of the media you insert.

The overall length of time used on that track will therefore change by the length of the new media clip that has been added.

Overwrite

Hotkey : b

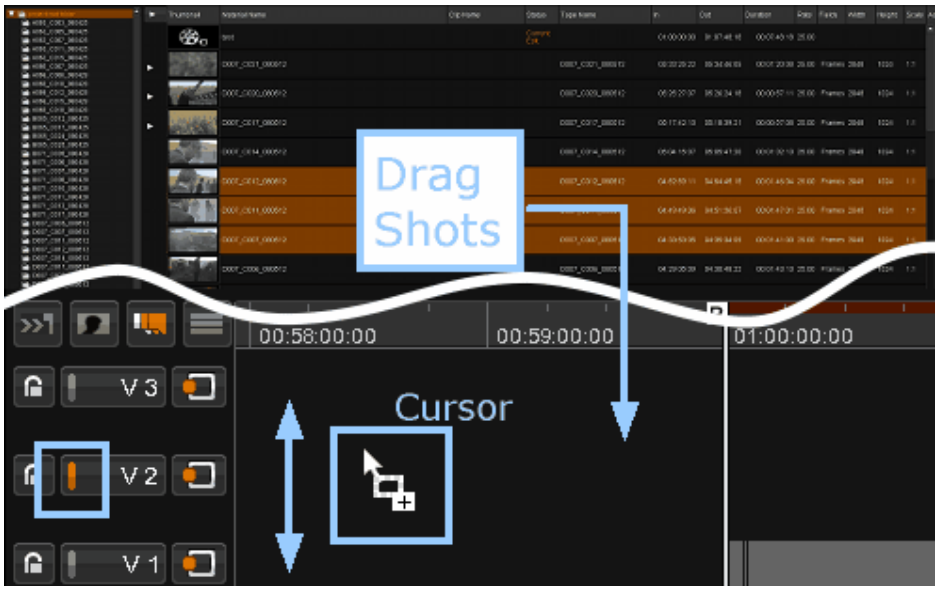
This operation will not move existing clip segments out of the way so the overall length of time used on that track will not change. Any existing clip segments will be overwritten.

Once a media *clip* has been added to the timeline we refer to it as a media *segment*. The source clip remains the same but a segment can be edited.

Drag and Drop

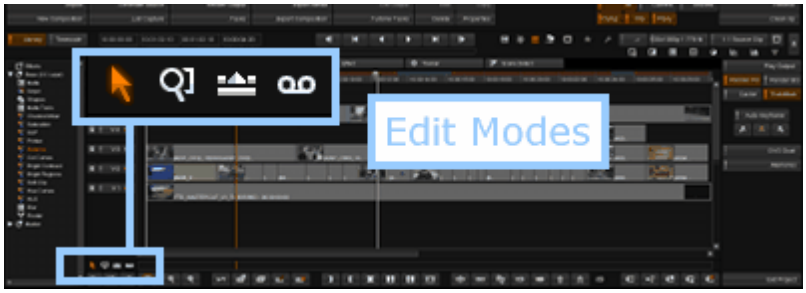
You can select one or more library clips and drag them to the composition timeline.

The shots will be placed onto the video track they are dropped on and this is indicated by the track *enabled* light being active.



Drag and Drop : track indicator light matches cursor position

Editing and Selection



An *edit mode* defines the behaviour of the timeline manipulation tools, including editing, moving, slipping, sliding and selection. There are four modes, the default being a *direct* selection tool.

Icon	Description
	Direct Select mode
	Region Zoom mode
	Move segments mode (segment editing)
	Trim mode

Direct Select

This is the default mode. Use the mouse to *left-click* a segment to select it (it turns orange).

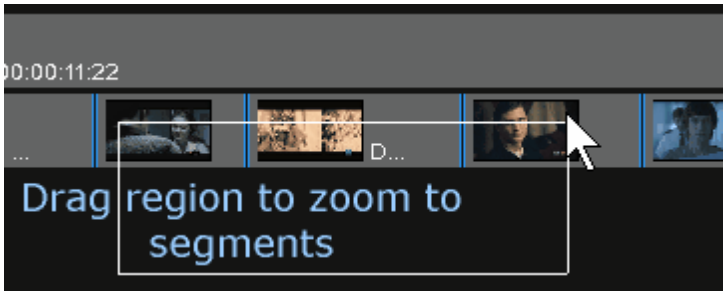
To **select** multiple segments :

- Drag a *selection box* with the mouse (see diagram below)
- Use the **SHIFT** key to *SHIFT-click* multiple segments and all segments in between
- Use the **CTRL** key to *CTRL-click* multiple non-contiguous segments.

Using the mouse to drag a selection region

Region Zoom

You can use the mouse to drag a selection box around a section of the timeline. On mouse release, the timeline will zoom to fit the selected segments.



Drag select a box and timeline will zoom to display segments.

Segment Editing

This mode lets you **move** or **copy** one or more segments on the timeline.

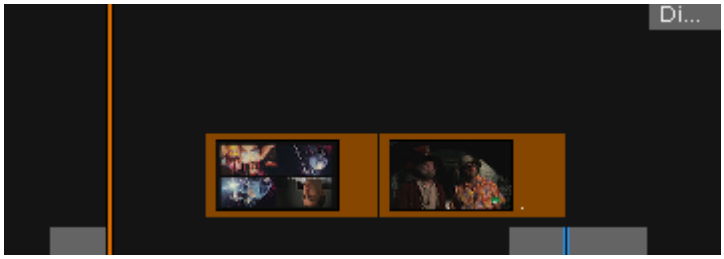
Select one or more segments as per the direct select mode described above. To move the selected segment(s), we drag with the mouse and to copy we use the keyboard short-cut keys.

Moving Segments

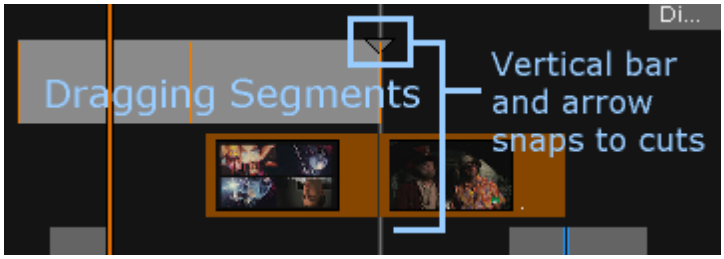
To **move** segments, select them, press with the left mouse button and drag them to the new location on your timeline. Dragging will obey *ripple* mode.

> If you are **not** in *ripple* mode, dragging one or more segments on top of other segments will **replace** the segments below. In *ripple* mode, the segments below are *pushed out of the way*.

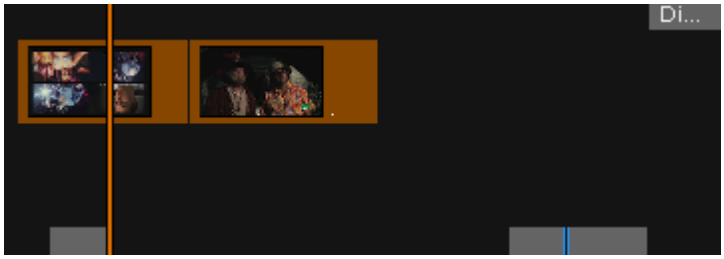
The default move mode is **snap to cut**. The start and end of the dragged segments will snap to any cut points they cross, and allow positioning flush to any other segment (beside, above or below).



Before : two segments selected



During : segments being moved by dragging. A vertical bar and arrow shows the dragged segments snapping to any cuts they cross.



After : segments moved to new position.

To position segments *freely*, with no snapping to cuts, hold down the **CTRL** key while dragging.

Copying Segments

Use the keyboard to **copy** the selected segments to a different location on your timeline.

Copy :	**c**
Splice :	**v**
Overwrite :	**b**

Splice will ripple the timeline and **ignore** *ripple mode*.

The segments will be inserted at :

- The *active* play-head location or
- The *Mark In* point if it exists

If a *Mark In* and a *Mark Out* point exists, the segments will be inserted to fit

between them, and *clipped* if longer.

Trim Mode

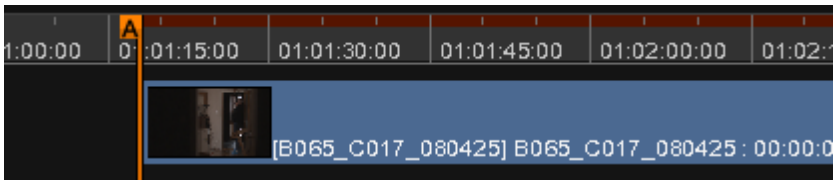
For discussion of trim mode, see Trim Modes below.

Marking Regions

When adding clips to the composition timeline, we take account of any timeline *marks* set (see Timeline Marks).

No Marks

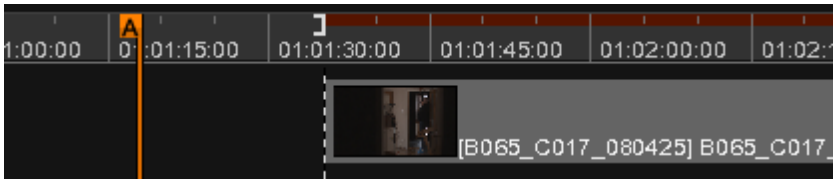
With no marks, a clip is inserted *full length* at the active play-head position.



No marks - splice to active play-head

Mark In

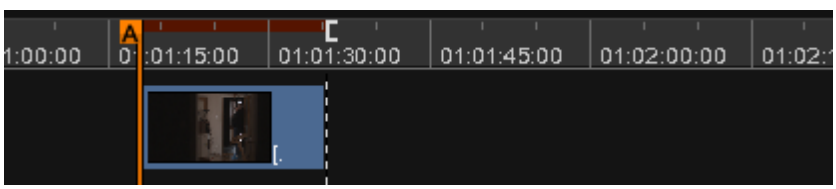
With a *Mark In* only, a clip is inserted full length at the *Mark In* position.



Mark In - splice to it

Mark Out

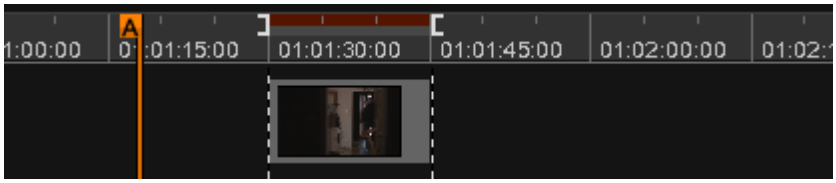
With a *Mark Out* only, a clip is inserted at the active play-head position. If the clip extends beyond the *Mark Out* point, it is truncated.



Mark Out - splice at play-head to mark

Mark In and Mark Out

With both a *Mark In* and a *Mark Out*, the clip is inserted at the Mark In position. If the clip extends beyond the *Mark Out* point, it is truncated.



Mark In and Out - splice from in to out

Deleting Media

To **delete** one or more segments from your timeline, select the segment(s) then :

- Press your keyboard **Delete** key or
- Press the *lift/remove* toolbar button

The track does not need to be enabled but must be *unlocked :*

> If you have *ripple mode* on, you may see timeline segments **move** to fill the space created. See below.

Removing Marked Regions

To delete a marked region :

a) Set your *Mark In* and *Mark Out* points
b) **Enable** and *unlock* the track you want to affect :

c) Press the *Lift Marked* button .

All media will be removed between the *Mark In* and *Out* points on the selected track.

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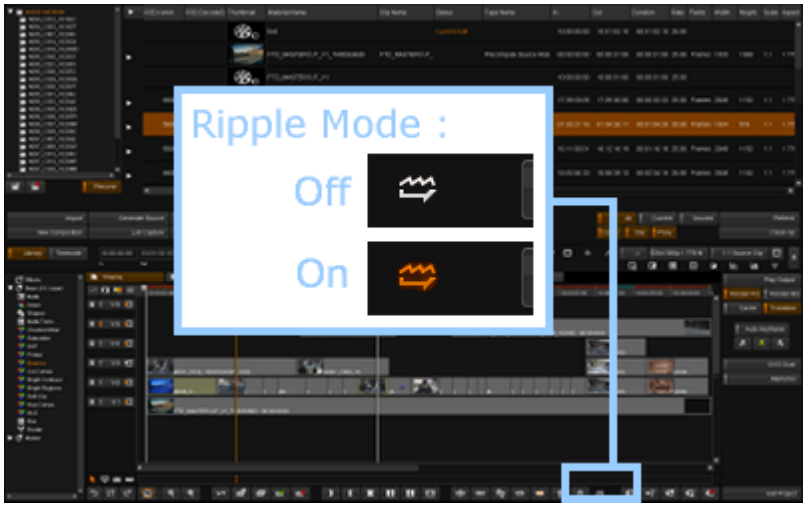
Ripple Mode

Ripple mode is a state that affects the behavior of all delete, move and trim operations, it can be toggled on/off via the button on the timeline toolbar :

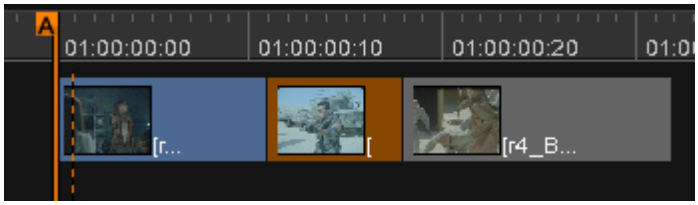


Any operations performed while ripple mode is **on** are rippled throughout the rest of the timeline so that any gaps created by the operation are closed. If ripple mode is turned **off** then a gap/filler will be left on the track in place of any segments that have been removed or trimmed down. See below.

> Ripple mode does **not** apply to *splice* and *overwrite* operations because these operations are inherently rippled (splice) or not (overwrite).

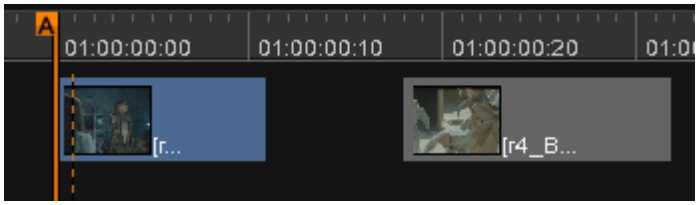
The following example shows the effect of deleting the middle of three segments, with and without *ripple mode* on.

Select the middle segment and press the *delete* key on keyboard :



Ripple Mode Off

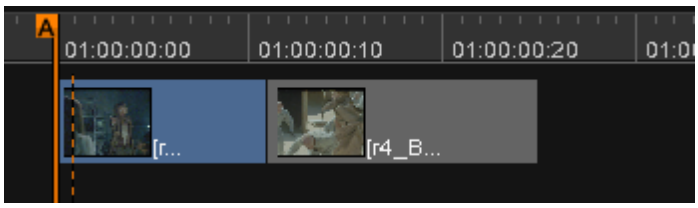
With ripple mode off, the gap remains.



Ripple Off - gap remains

Ripple Mode On

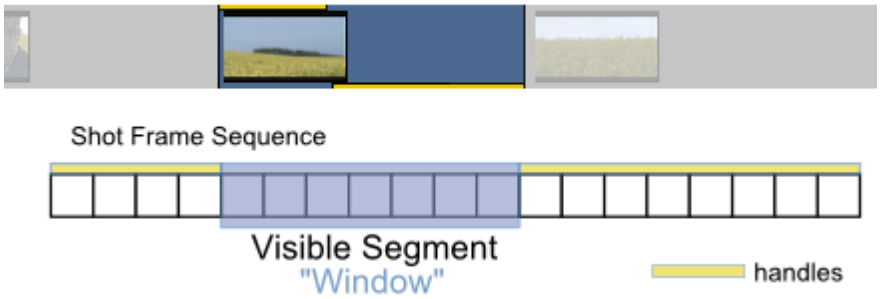
With ripple mode on, the segment to the right is shifted left and closes the gap.



Ripple On - segments collapse and fill gap

Trim Modes

A timeline segment can be considered a "window" on the sequence as it exists on disk and there may be frames both before and after those we can see in the monitor window.



Using the *trim toolset*, we can adjust the portion of the shot we see, including the visible start and end frames.

The start and end portions of a shot we do not see are known as *head* and *tail* **handles**.

Trim Mode

You can enable trim mode via a shortcut key or a GUI button :

CTRL + u (this toggles trim mode)

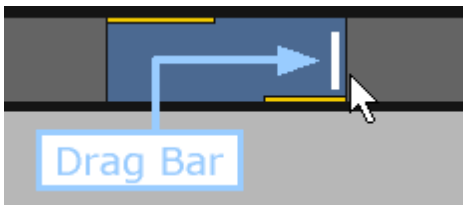
To enter *Trim Mode*, the timeline area of the GUI has to be in **focus**. You can focus it by left-clicking once with the mouse.

In trim mode, if a segment has head or tail handles, these will be indicated visually in **yellow.** Any available shot handles will be shown inside the shot itself :

Centre shot has both head (left) and tail (right) handles, shown in yellow.

Trimming

In trim mode, **handle drag bars** will be visible when you move the mouse over them :



Hover over shot with mouse and handle drag bar appears

Click drag bar to select

You should select the drag bar by left-clicking once (drag bar turns *orange*) before attempting to trim.

With a drag bar selected, you can trim a shot by :

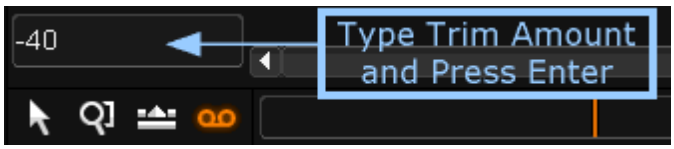
- **Dragging** with the mouse
- Using the keyboard **shortcut** keys (see below)
- **Typing** in a trim value

The **keyboard shortcuts** are as follows :

Key	Description
<	Trim left one frame
>	Trim right one frame
M	Trim left 10 frames
/	Trim right 10 frames

See the *Hotkeys* guide distributed with the software. Note that these keys refer to the Digital Vision application keyboard and the key names may be different on a normal keyboard.

You can enter a value directly by typing it into a numeric text entry box that appears above the edit mode buttons. Use a *negative* value to trim backwards :



Number entry box for trim mode

If a shot has head handles, the *offset* (as a timecode) of the first visible frame of the segment is shown on the segment. This is the *Source Offset* :

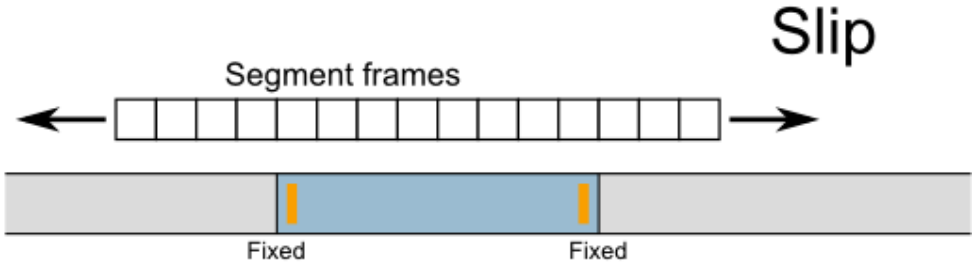
Source offset displays current number of frames to first frame visible

If you trim the head of a shot, the source offset will update.

You will not be able to trim a shot beyond the available handles and no change to the shots on the timeline will occur if you type such a value into the trim edit box.

Slip Mode

Slipping allows you to change the range of source frames that are used in a segment, changing the start and end frames, without changing the position of the segment within the timeline or its overall length. This is useful for synchronizing video segments to audio.



Slip Mode : Segment stays fixed on timeline but start and end frames change.

To activate slip mode, select the head and tail trim handles of the same segment. You can do this via the short-cut key :

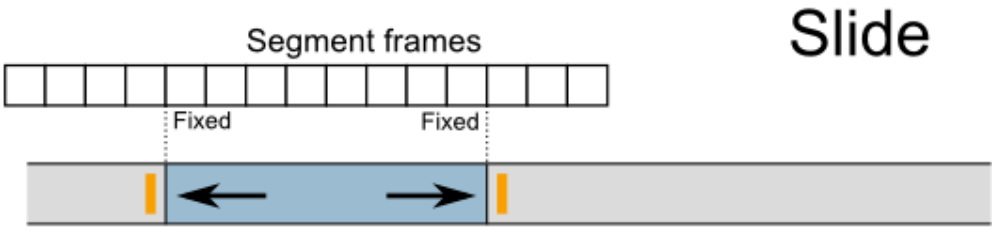
CTRL + t

Slip Mode handles inside segment

You can slip the shot by typing a value into the trim edit box or using the keyboard short-cut keys, as described above.

Slide Mode

Sliding allows you to adjust the position of a segment within the timeline by sliding it left or right. The tail of the previous clip and the head of the subsequent clip are trimmed automatically to match the repositioned segment and the overall length of the composition stays the same.



Slide Mode : Segment moves along timeline, start and end frames stay fixed.

To activate slide mode, select the trim handles on the segments adjacent to the segment you want to slide i.e. the tail of the preceding segment and the head of the next segment. You can do this via the short-cut key :

CTRL + y

Slide Mode handles outside segment

You can slide the shot by typing a value into the trim edit box or using the keyboard short-cut keys, as described above.

Cuts

A cut (or edit point) splits a timeline segment up into two parts. There are two types of timeline cuts defined, a *scene* cut and a *normal* cut.

Scene Cut

Short-cut : c

GUI :

A scene cut is a cut inserted *manually* inside the application via :

- The *cut* button (or keyboard shortcut)
- The *scene detect* module
- An EDL used to "cut up" pre-loaded and spliced timeline media.

You cannot *trim* scene edits.

Normal Cut

Short-cut : N/A

GUI : N/A

A normal cut is an editorial decision and will be created via :

- An EDL
- An AAF file

Normal cuts will (normally) have handles and allow head and tail trimming.

Creating a Field Edit

Short-cut : Shift + c

GUI : N/A

In a *field* based project, you can insert an edit on a field boundary. Field edits are displayed with a "stitched" line as shown below :

Field Edit is "stitched".

You will need to be in *Field Mode* to insert a field edit. This is indicated by the "asterisk" button :

Field toggle button (enabled)

To insert an edit on a field boundary, enable field mode, set the play-head at the desired timecode and use the keyboard short-cut **Shift + c**

Note that the timecode indicator displaying your current location on the timeline has an asterisk (*) appended when you are on a field boundary :

When play-head on a field boundary, location shows a "*".

Toggle Scene Cut to Normal Cut

Short-cut : N/A

GUI :

You can *toggle* a scene cut to a normal cut (and vice-versa) by pressing the toggle edit button.

Joining Contiguous Segments

Short-cut : N/A

GUI :

You can join two *contiguous* segments together by selecting them both and pressing the *Remove Matched Edit* button :

The segments you are joining have to be from the same media source, adjacent to each other in the timeline, and in increasing source time order. Trimmed out frames from either of the segments is allowed, as the underlying material will still exist and the join operation can put the segment back together.

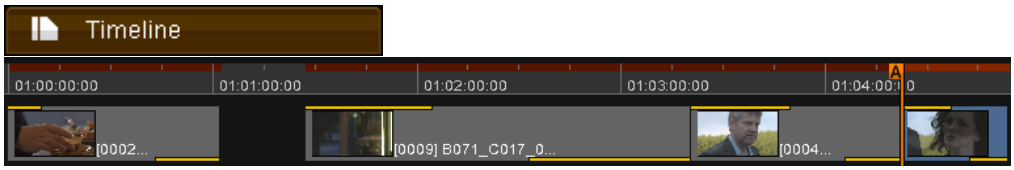
Shots View

The second view we have of the timeline is *Shots* view. To select *Shots* view, click the *Shots* tab or press the **F3** short-cut key.

The *Shots* view shows a video **mix-down** of the shots in your composition such that we only see the segments that are topmost in the timeline view. We show :

- We show a *single frame* of each timeline segment.
- An indication of any applied effect layers are placed on top (optionally).
- Gaps in the timeline are shown as black shots.

The two illustrations below show the timeline view and its associated Shots view.



Timeline view.

Shots view of timeline above.

The frame displayed is from the *middle* of the segment. This is not configurable currently.

Shots View Switches

To the left of the shots themselves are some buttons that affect the display and ordering of the shots.

Thumbnails

This toggles the *size* of the displayed thumbnails.

Play-heads

Toggles the display of all play-heads or only the active play-head.

Effect Bars

Toggles the display of the effects bars above the shot.

Src / Rec Switch

Toggles the display of the shots in *record* timecode order (default) or *source* timecode order.

> This will affect **VTR layoff** and is linked to Tapename Sort (below). Set to **SRC** for a *Source Order (C)* VTR layoff.

Handles Mode

Toggles handles mode.

Normally, we can only play the *visible* (non-handle) portion of a segment. In *handles mode*, we can step through and play entire shots, *including* playing through **head and tail handles**. The play-head position will update to show us our position within the shot and accounting for handles.

This requires us to be in **SRC order** view.

Tapename Sort

This will sort the shots to be in *tapename* order (then source timecode order). **You must be in SRC timecode order (SRC switch enabled).**

> This will affect **VTR layoff** and is linked to Src/Rec Switch (above). Enabling this results in a *Source Order Tape (C)* VTR layoff.

Effect Indicators

Any applied effects are indicated above the shot using coloured bars : *Base* layer, *CC/FX* layer, *Master* layer and *Pan/Scan.* If multiple FX or CC layers are present, these are indicated by small boxes in the LY bar :

In the illustration on the right, the shot on the left is the *active* shot (blue outline).

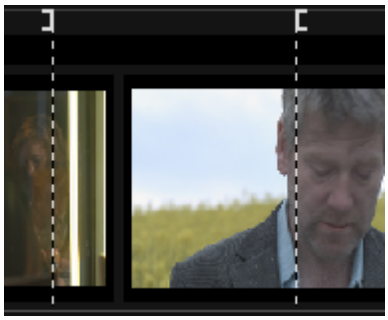
All effect layers have an applied effect (coloured bars) and there are **two** CC/FX layers indicated (two boxes on LY bar).

Active shot on left, with effect indicator bars

You can toggle the display of the effect indicator bars using the

Marks

Timeline *Mark In* and *Out* points will be shown with dotted lines :



Handy Hotkeys

icon	hotkey	function
	TAB	Toggle full-screen mode, i.e. hiding the GUI
	ESC	Exit full-screen mode, back to GUI mode
	G	Zoom into the active region of the timeline

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	F	Fit the whole timeline into the viewing area
none	+ / -	Zoom timeline in/out
none	mouse wheel	Zoom timeline in/out
none	Ctrl + drag mouse left/ right	Pan the timeline left/right
none	Ctrl + Shift + drag mouse up/down	Zoom tracks in/out, showing bigger/smaller thumbnails
none	Ctrl + F2	Toggle between standard timeline view and large panel view
none	Ctrl + HOME	Switch to the next play-head making it the active play-head
none	HOME	Jump play-head to the start of the composition
none	END	Jump play-head to the end of the composition
none	[or Down Arrow	Jump play-head to the start of the previous edit
none	] or Up Arrow	Jump play-head to the start of the next edit
none	Ctrl+[or Ctrl+Down	Jump play-head to end of the previous segment
none	Ctrl+] or Ctrl+Up	Jump play-head to the end of the segment
	I	Set mark-in point at the play-head position
	O	Set mark-out point at the play-head position
	P	Set mark in and out points around selection
	Ctrl + I	Clear the mark-in point
	Ctrl + O	Clear the mark-out point
	Ctrl + P	Clear the both mark-in and mark-out points
none	Shift + I	Jump play-head to the mark-in point
none	Shift + O	Jump play-head to the mark-out point
	V	Splice a clip onto the active track
	B	Insert a clip onto the active track overwriting segments if necessary
	DELETE	Remove selected segments from the timeline

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		Remove marked region from the timeline
	C	Insert an edit/cut
	Shift + C	Insert a field edit/cut
	Ctrl + C	Remove an edit/cut, rejoining two adjacent segments
	Ctrl + U	Toggles between Direct Select Mode and Trim Mode
none	Ctrl + T	Toggles slip mode on/off, when in Trim Mode, and activates the segment trim handles
none	Ctrl + Y	Toggles slide mode on/off, when in Trim Mode, and activates the segment trim handles
none	M	Trims the active handle back 10 frames.
none	<	Trims the active handle back one frame.
none	>	Trims the active handle forward one frame.
none	/	Trims the active handle forward 10 frames.
none	F3	Switch to Shot List View
none	Ctrl+F3	Toggle large shots view / standard view

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Versions

8

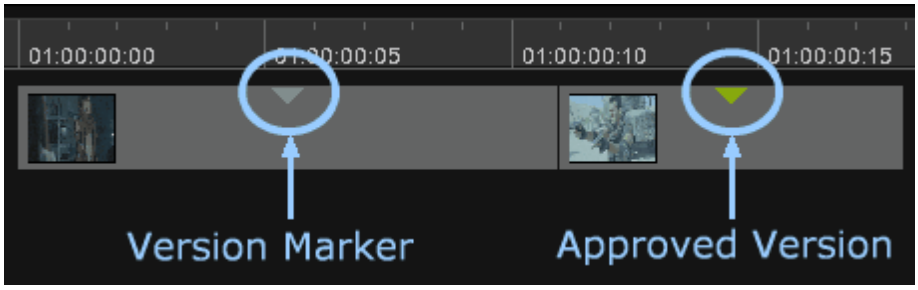
2014.1

Versions 8

When adding a media clip to a composition timeline it is possible to add it as a ***version*** of an existing clip segment instead of as a new segment.

By adding a *version* you preserve the underlying clip segment in the composition along with all the changes you have made to it (e.g. trimming or effects). *Versions* therefore allow you to experiment with different clips, or to make gradual changes to a clip segment and save each one as a separate version until you decide which version you want to keep.

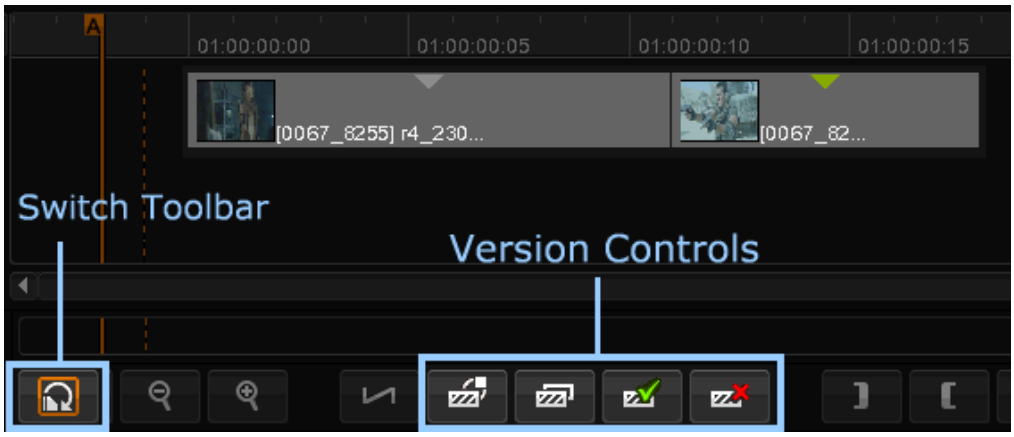
A segment containing a version is denoted on the timeline by a triangle in the centre:



Grey triangles denote the presence of underlying versions in that segment, and a green triangle identifies the *approved version*. Approving a version is simply a mechanism that allows you to differentiate your preferred version from all the others. You can change the approved version at any time.

Version Controls

The buttons for adding, approving, and deleting versions are on the *timeline toolbar*:



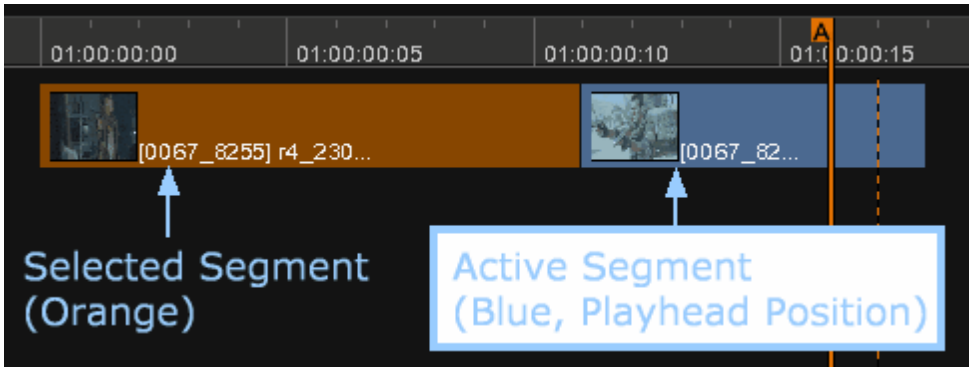
	Add a source (duplicate) version (for active shot). **Hotkey : CTRL + N**

	Add a grade version (for active shot).
	Approve current version.
	Delete current version. **Hotkey :** SHIFT + N

Adding Versions

To add a version you have to first determine which segment on the timeline you want to version.

- A *single* **selected** segment (orange) takes precedence
- Otherwise, the *active* segment is versioned



When you're versioning it is not necessary to activate the track because we are explicitly selecting a segment to version. However, if the track that the selected segment is on is *locked*, then versioning will not work.

Once you have selected the timeline segment that you want to add a version to you have two choices, you can either:

- add a shot from the library as a new *ungraded* version (source version), or
- add a *duplicate* version of the existing timeline segment (grade version)

Add New Source Version

Hotkey : CTRL + N

A new shot version is a different shot to the one that is already present in the selected segment of the timeline. It can be the same source media clip, but it is different from the shot on the timeline in that it will not have any grading

applied.

To add a new shot version :

1. Select the media clip to add from the library
2. Select the timeline segment to add the version to
3. Press the ***Add Version*** button :

> **!** The media clip that you select to add as a version has to be **at least as long** as the timeline segment used. You cannot add a media clip to a segment if the clip is shorter than the segment.

Once the new version has been added a triangle will appear in the centre of the segment to denote the presence of underlying versions, and the new version will be the one that appears on top and visible in the viewer.

Add Duplicate (Grade) Version

To add a new duplicate grade version :

Select the desired timeline segment

Press the ***Add Grade Version*** button :

This will add another version of the same shot, retaining any grading and trimming carried out up to that point. Any selected library clips will be ignored.

As with adding a new version, a triangle will appear in the centre of the segment to denote the presence of underlying versions, and the new version will be the one that appears on top.

Handy Hotkeys

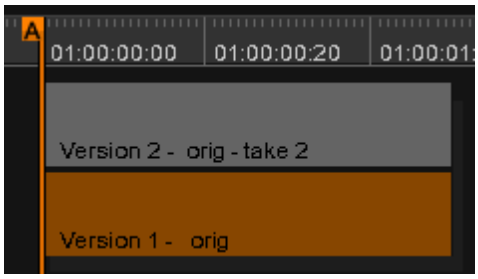
icon	hotkey	function
	Ctrl + N	Adds a selected clip from the library as a new version
	none	Adds a duplicate graded version of the shot selected on the timeline

Managing Versions

Viewing Versions

To view the different versions underlying a segment simply click on the

triangle in the middle of the segment. This will open up a drop-down list of all the versions in that segment:



Two versions visible in dropped-down view.

You can change the active version by selecting any other version from the list.

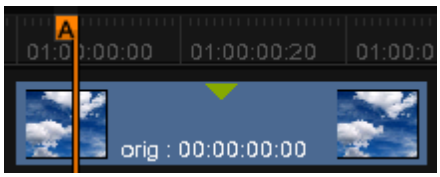
Versions are numbered *Version 1* (original), *Version 2* etc. To the right of the version number is the *Material Name*.

Approving Versions

If you want to mark a version to denote that it is the preferred version, you can do so by *approving* it. To do this:

1. Select the version that you want to approve from the versions list so that it is the active version, visible on the timeline
2. Select the segment on the timeline so that it turns orange
3. Press the ***Approve Version*** button on the timeline toolbar

The version indicator will change from grey to *green* to indicate that you are now viewing the approved version:



Green triangle signifies the approved version.

If you later select a non-approved version to view, the indicator will turn back to grey.

You can change the approved version at any time, simply by selecting a different version as the active version and approving it following the steps above. This will set the previously approved version back to unapproved and set the new selection to approved.

Deleting Versions

Hotkey : SHIFT + N

To delete a version at any time:

1. select the version to be deleted so that it is the active version on the timeline
2. select the segment on the timeline so that it turns orange
3. press the ***Delete Version*** button on the timeline toolbar :

The active version will be removed from the list and the next version in the list will become the active version. At this point the version numbers will reshuffle to close the number gap created by the deleted version.

If on deleting a version there is only one version left, the triangular version indicator will disappear from the segment and the segment will return to being a regular segment without versions.

> **!** Version operations are always applied to the active or selected segment on the timeline, so the active/selected segment must be appropriate for the operation being carried out otherwise no action will be performed.

Rendering

Rendering 9

Adding effects to segments, or transforming sources for output, will require CPU processing: rendering. This rendering normally happens transparently in the background as you work, and in most circumstances requires no explicit intervention.

Master layer effects are rendered in *realtime* on the graphics card **GPU** and do not require system CPU processing.

You will have to *render* your composition if you :

- Add *effect* layers or
- Add *adjustment* segments
- Create and use *proxy* sources (1:1 Clone, 2:1 etc.)
- Create *source caches* (for example, from MXF, Quicktime or Red raw files)

Proxy Source vs Source Cache

A *proxy* source and a *source cache* are technically the same thing but we differentiate them because :

a) A *source cache* is always **1:1** (equivalent to *1:1 Clone* proxy) and
b) A *source cache* requires no explicit proxy format created on the project. The cache proxy is created *automatically* and *transparently*.

Note that (b) is only true if you leave the `createClone` parameter *true* (for the relevant file format) in the preference file :

```
C:\Nucoda\2014_1\root\Clip.prefs
```

The following buttons control the rendering process in your project:

Render Controls

The *automatic* render controls toggle between different rendering behaviour, and the *manual* render controls let you set off specific rendering tasks.

Automatic Render Controls

These controls are *automatic* in that they are toggled on or off, and affect the render processing from then on.

Render BG

Default : On

With The *Render BG* button enabled, some resources are devoted to rendering the *active* composition **in the background** while you work. This background rendering will only occur if the application is otherwise idle and will pause when a more important workload surfaces (e.g. if you play the timeline, or need interactive response during grading adjustments).

By default, all new projects have the *Render BG* button enabled.

Render BG can greatly reduce rendering requirements with little impact on your interactive work. It is generally a good idea to leave it enabled.

Render FG

Default : On

This will cause *unrendered* portions of the timeline to be **rendered** for display when *playing* timeline. If this button is disabled, playback of unrendered timeline areas will display grey "not generated" frames :

Cache

Default : Off

The *Cache* button is relevant to composition **playback only**. During timeline playback, any unrendered frames are rendered on-the-fly dynamically for display (if *Render FG* is enabled) but are not normally saved to disk. Enabling the *Cache* button causes any unrendered frames encountered during playback to be saved to disk.

This rendering is identical to that done with *Render BG* enabled or when doing a *Render Output* operation, except it occurs only during timeline playback (of unrendered frames).

Enabling the *Cache* button may affect timeline playback due to the extra work required to save out rendered frames to disk.

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Transition

Default : On

The *Transition* button enables the rendering of transition effects (e.g. dissolves).

Manual Render Controls

These controls are in the project library and let you set off **specific** render tasks, such as rendering a specific portion of the timeline, or rendering and exporting media.

Render Output

Pressing the *Render Output* button will start (or *queue*) a render task for the currently active composition.

> Only *visible* video tracks are rendered (we render a "mix-down").

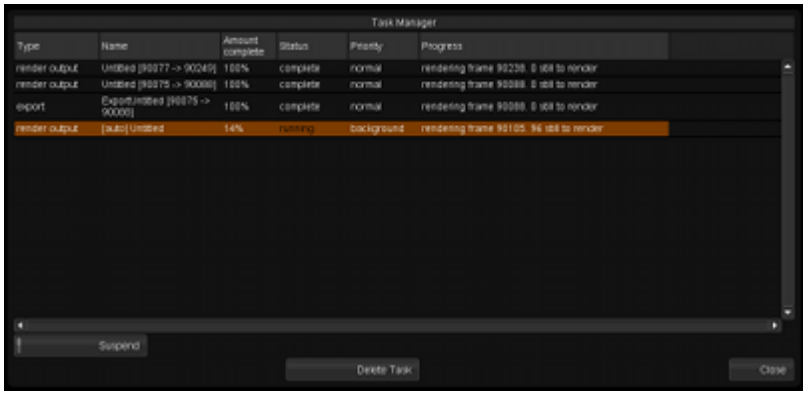
If you have marked an in-point, we will render from this position until we reach an out-point, or the end of the composition. If there is no in-point, we export the *entire* composition. If there is a *Mark In* and *Mark Out* set, we render any unrendered material lying between them.

Export Media

For a discussion of the *Export Media* options, see the Exporting section.

Task Queue

Render tasks and their status will appear in the *Task Manager.* This is accessible via the *Library/Tasks* button. Tasks are displayed in the Task manager window, with their progress and status :



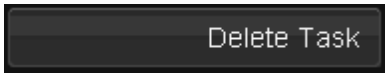
Task Manager

Render tasks include both *Render Output*, *Render BG* and *Export Media* tasks.

Suspend Tasks

The *Suspend* button will suspend all running tasks.

Delete Tasks



You can delete one or more tasks by selecting them and pressing the *Delete* button.

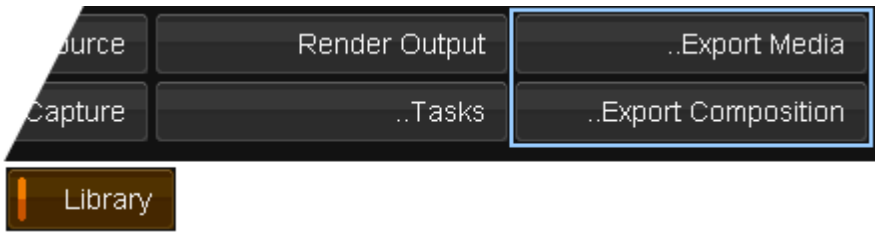
10

Exporting

2014.1

Exporting 10

There are two export options available from the Library :

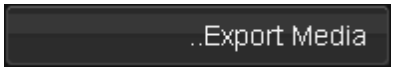


Library / Export buttons

- *Export Media* renders and exports a composition to a chosen file format (DPX, TIFF, MXF etc.).
- *Export Composition* exports the active composition as a list file e.g. an EDL

> Version 2014.1 also lets you export to an AAF composition via .. *Export Media*. This requires the composition you export as AAF to have been created *from* an AAF.

Export Media



The *Export Media* button will let you export the active composition to a file (or sequence of files) in your chosen location and in your chosen format.

> If not already rendered, an export will render all applied effects.

If you have marked an in-point, we will export media from this position until we reach an out-point, or the end of the composition. If there is no in-point, we export the composition from the start until we reach an out-point or the end of the composition.

See File Format Support for supported file formats.

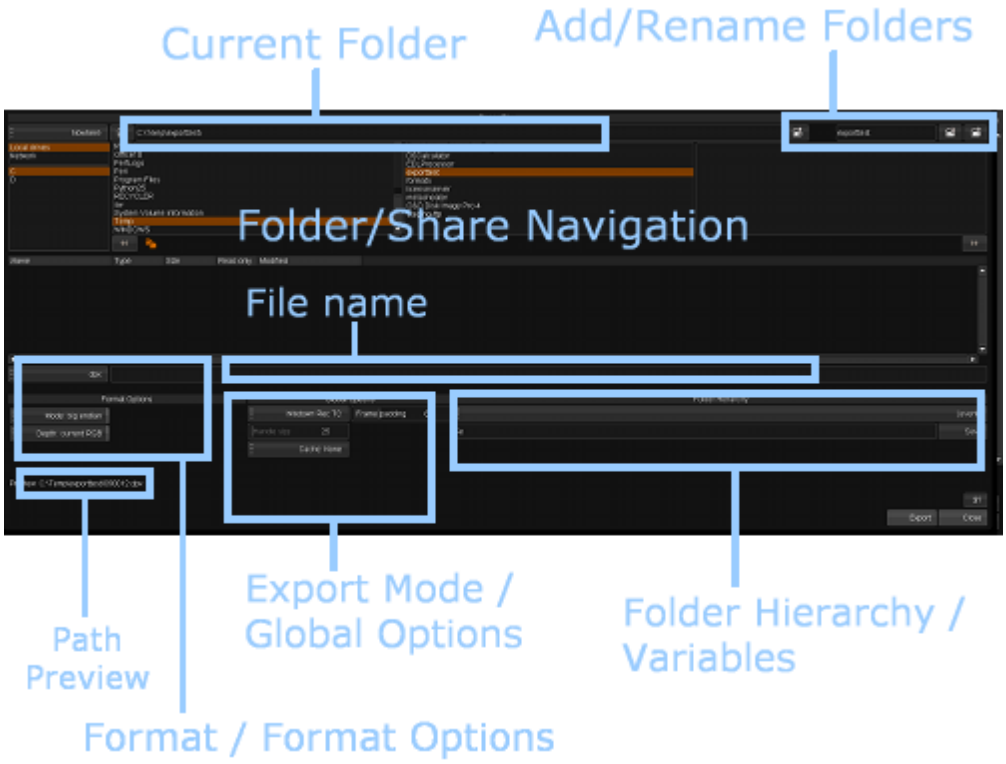
From the *library*, press the *..Export Media* button, this will launch the *export browser* and let you navigate to the desired export location.

The Export Browser

The *Export Browser* consists of a number of separate elements that let you :

- Navigate to the *base* folder you wish to write the exported frames to
- Choose the desired file *format* and format options
- Choose the *export mode* (default is *record timecode* order, as a *single* clip)
- Choose any *global options* to set (some depend on export mode chosen)
- Choose the filename (if any - default to numeric names only)

The various component parts of the *Export Browser* are shown below.



Navigate to the desired folder using the standard file browser controls. Set the desired file format, format options (if any), export mode and global options using the controls at the bottom of the browser.

Export Path Preview

A **preview** of the path and filename we will create using the current settings is displayed at the bottom on the browser window.

The following settings :

Current folder :	`Z:\projects\SH_77TH\exports\van3d\`
Filename typed :	`$c_outputcc..`
Folder Hierarchy set :	`$c_$o\$r`

will preview as shown below :

File Format and Options

Use the drop-down list to select a file format for your export. Options available for the selected format will be displayed in the *Format Options* panel below :

See File Format Support for supported file formats.

> Switching to a different file format will **reset** the *Global Options* to their **default settings**.

Filename and Number

Name your exported sequence(s) by typing in a name in the text box. This will

be the **base name** for every exported shot (even when multiple shots are created on export).

- If you do not type in a *base name*, file names will be **numeric only** e. g. 007845.dpx
- Numbers are added automatically to exported sequences and correspond to the frame timecodes. The numbers thus depend on the selected *export mode* (and may be *record* or *source* timecodes)
- File extensions are added *automatically*

Number Handling

Frame numbers will be added *automatically* on export, zero-padded to the specified width (Frame Padding). The frame numbers correspond to the *record* (Rec) or *source (Src) timecode* as per the chosen export mode.

Because numbers are added automatically, some care has to be taken if you choose to type in **numbers** as part of the *base file name*.

If you type in numbers as part of the base file name :

- **Rec TC** modes **use** the numbers as the *starting* timecode/number for **every** shot created. If shots are exported to *multiple folders*, **every** shot in **every** folder will start at the given number.
- **Src TC** modes **ignore** any numbers and always use the **source** timecode for shots created.

A filename entered as `test` will usually result in a file called `test090000.dpx` (or similar).
To put another "." before the numerics, enter a filename `test..` (note the two dots).
This results in a file called `test.090000.dpx`.

Using Variables in File Names

You can also use *variables* in the file entry box e.g.

```
$t_graded_
```

might expand to a base filename :

```
newrtt1_graded_
```

See the Folder Hierarchy and Variables for a list of variables available.

Examples

Filename	Pad	Sample File Created	Note
(nothing typed)	6	078456.dpx	
4883	7	0004883.dpx	*A Rec TC* export mode
4883	7	0000096.dpx	*A Src TC* export mode
testexport	7	testexport0006734.dpx	Frame Padding = 7
$c_graded..	0	shot677_graded.89345.dpx	

Global Options

The *Global Options* panel displays options available to **all file formats**.

Export Mode

The export *mode* determines how a composition is exported. See Export Modes below.

Frame Padding

Use this slider to choose the width of frame numbers added to exported sequences. Numbers are zero-padded.

Number	Frame Padding	Result
789	0	789
789	6	000789
456789	4	456789

Target

Export graded material or source (ungraded) only.

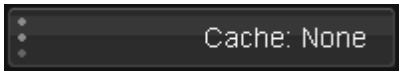
Target: **Output**	Output *graded* material (as per timeline *Play Output* view)
Target: **Source**	Output *source* (ungraded) material (as per timeline *Play Source* view).

Handle Size

This sets how many *head* and *tail handles* frames are exported with each shot.

You can only set handles when using a *Multi* mode export (see below).

Caching



The *Cache* option lets us choose whether to save (internally) any *cache renders* or *proxies* created as part of a render export process.

Cache :	Description
None	No internal caches or required proxies are saved in the application data store.
Proxies	Save any required proxies.
All	Save both caches and proxies created (if any).

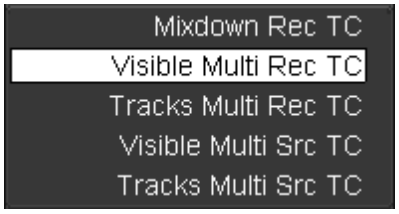
SMPTE Level Clip

The *SMPTE Level Clip* toggle button will **clip** the exported frame colour data to a **SMPTE legal range** (64-940 for 10 bit data).

This is only available inside a *Linear (SMPTE)* colour space project.

See the *Colour Scaling* section of the *Setup Manual* for a discussion on colour space and scaling.

Export Modes



The export *mode* determines which shots we export, what timecodes we use, how we order the shots and (usually) whether to create any folder structure.

There are five modes :

- Mixdown Rec TC
- Visible Multi Rec TC
- Tracks Multi Rec TC
- Visible Multi Src TC
- Tracks Multi Src TC

The default is *Mixdown Rec TC* i.e. a **single mixed down sequence using record timecodes**.

Each mode consists of important keywords that describe how the mode works :

Mixdown	A **single** clip is created on export.
Multi	**Multiple** clips are created on export
Visible	A shot is only exported if **any part of it is visible**.

Tracks	Shots are exported per **track**. In this mode, clips are exported even when **fully hidden** by other clips.
Src / Rec	Clips are exported in **source** or **record timecode** order. This also affects the *timecodes* used (header and filename).

Track Monitoring
Every mode obeys track *monitoring*.

An un-monitored track never takes part in *any* export mode.

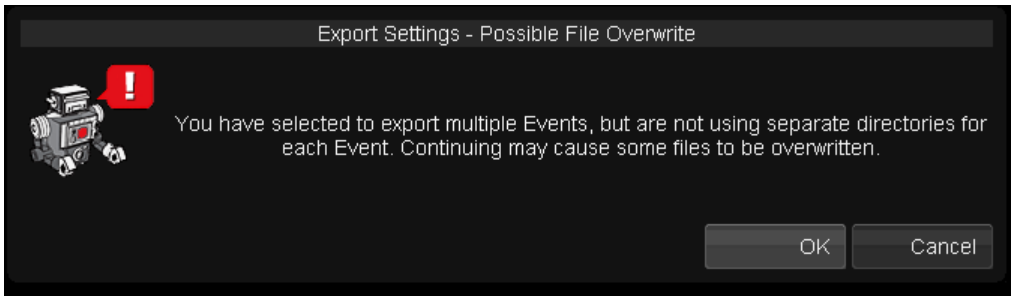
Multi-Mode Exporting

Care needs to be taken when using multi-mode export.

Multi-mode exports can cause shots to be **overwritten** on export.

Due to the fact that some shot metadata can overlap (e.g. timecodes, tapenames etc.), it is possible to export in such a way that shots get overwritten.

For this reason, multi-mode exports will **warn** you if you do not use an *event folder* output structure when exporting :



If you know that your output clips do not overlap, you can press the OK button to continue.

See Folder Hierarchy and Variables.

Mark In/Out Points

Every mode will take account of any *in* or *out* points marked.

Begin an export from an **In** point.
End the export at any **Out** point (or the end of the composition).

Mixdown Rec TC

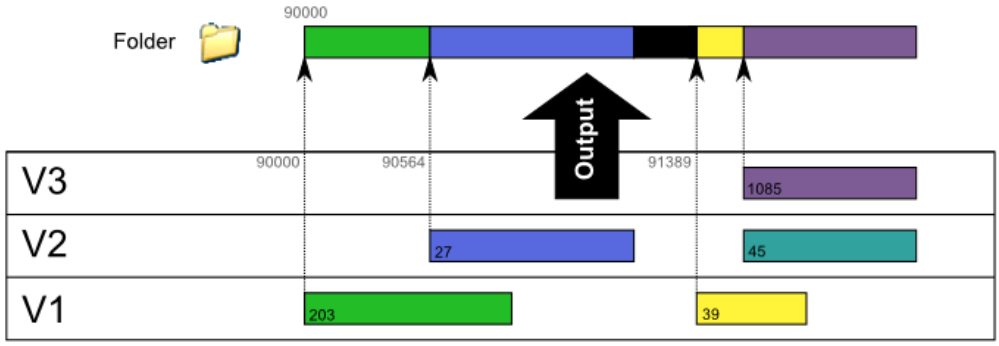
Exports as :

- **Single clip** - a flattened, mixed-down contiguous sequence into *one folder*.
- BL, AUX and filler *included* in export
- No handles allowed
- **Record** order and timecodes

Filler will be exported as **black frames** at the *level* defined by *project colour space*.

Example

No folder hierarchy or variables required.



Mixdown Rec TC

Visible Multi Rec TC

Exports as :

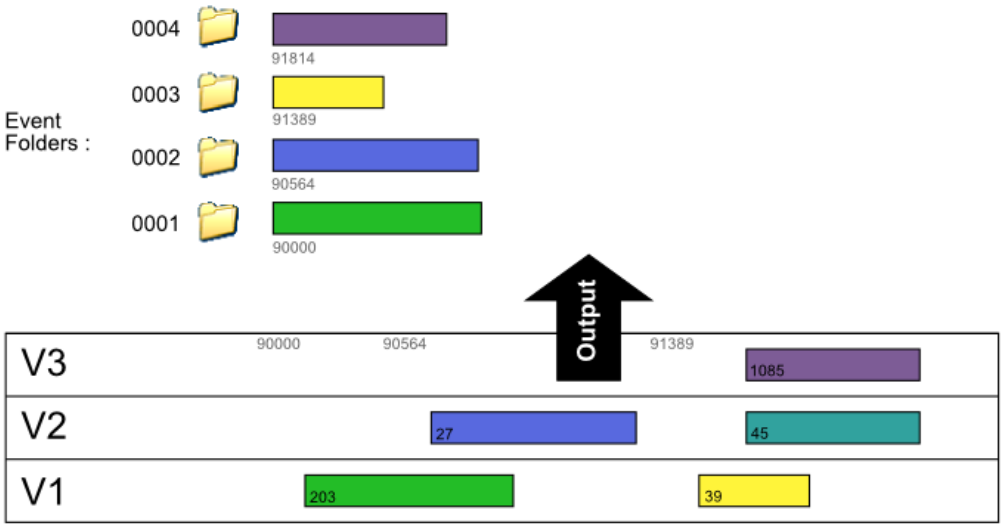
- **Multiple clips** created
- No BL, AUX or filler
- Handles allowed. Adjust via *Handle size* slider :

- **Record** order and timecodes
- Clips are only exported if they are **visible** (even partly)

Example

Here, we use *event folders* (see Folder Hierarchy and Variables) to ensure exported shots do not overlap.

See Multi-Mode Exporting for a description of why multi-mode might cause exports shots to be overwritten sometimes.



Visible Multi Rec TC

Tracks Multi Rec TC

Exports as :

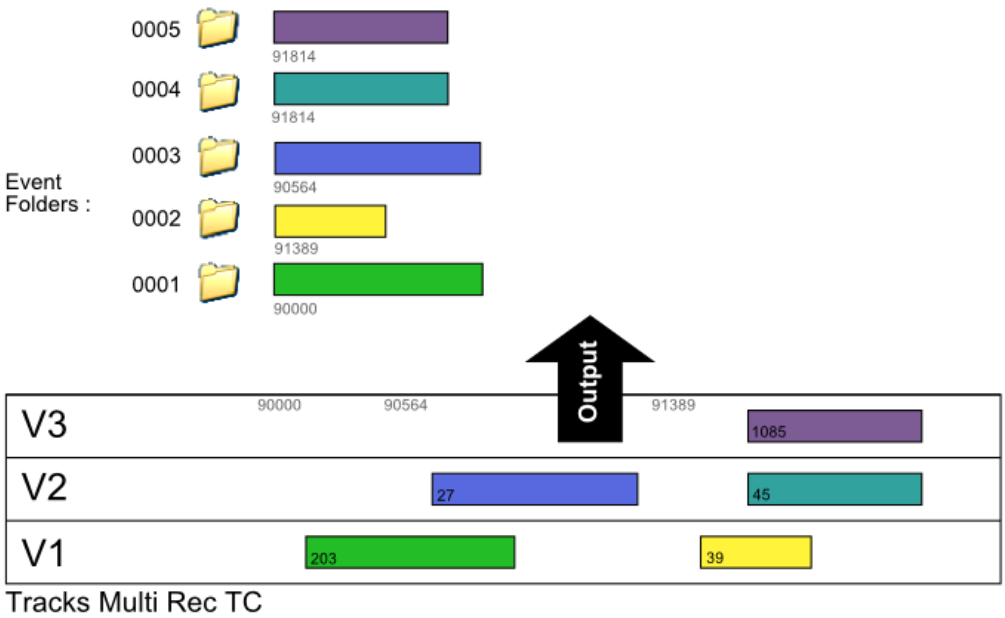
- **Multiple clips** created
  - No BL, AUX or filler
  - Handles allowed. Adjust via *Handle size* slider :

  - **Record** order and timecodes
  - Clips are exported **even if hidden** by other clips.

Example

Here, we use *event folders* (see Folder Hierarchy and Variables) to ensure exported shots do not overlap.

> See Multi-Mode Exporting for a description of why multi-mode might cause exports shots to be overwritten sometimes.



Tracks Multi Rec TC

Visible Multi Src TC

Exports as :

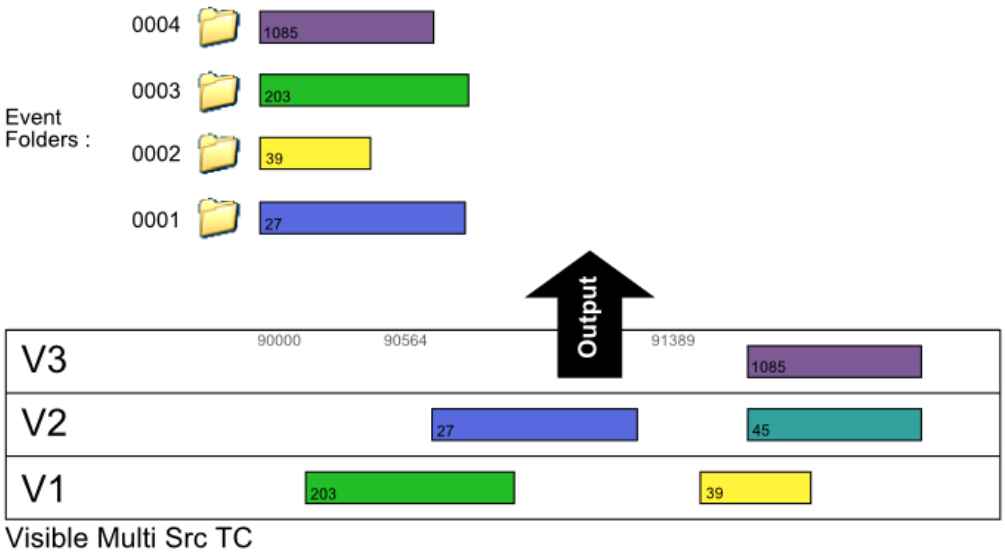
- **Multiple clips** created
  - No BL, AUX or filler
  - Handles allowed. Adjust via *Handle size* slider :

  - **Source** order and timecodes
  - Clips are only exported if they are **visible** (even partly)

Example

Here, we use *event folders* (see Folder Hierarchy and Variables) to ensure exported shots do not overlap.

> See Multi-Mode Exporting for a description of why multi-mode might cause exports shots to be overwritten sometimes.



Visible Multi Src TC

Tracks Multi Src TC

Exports as :

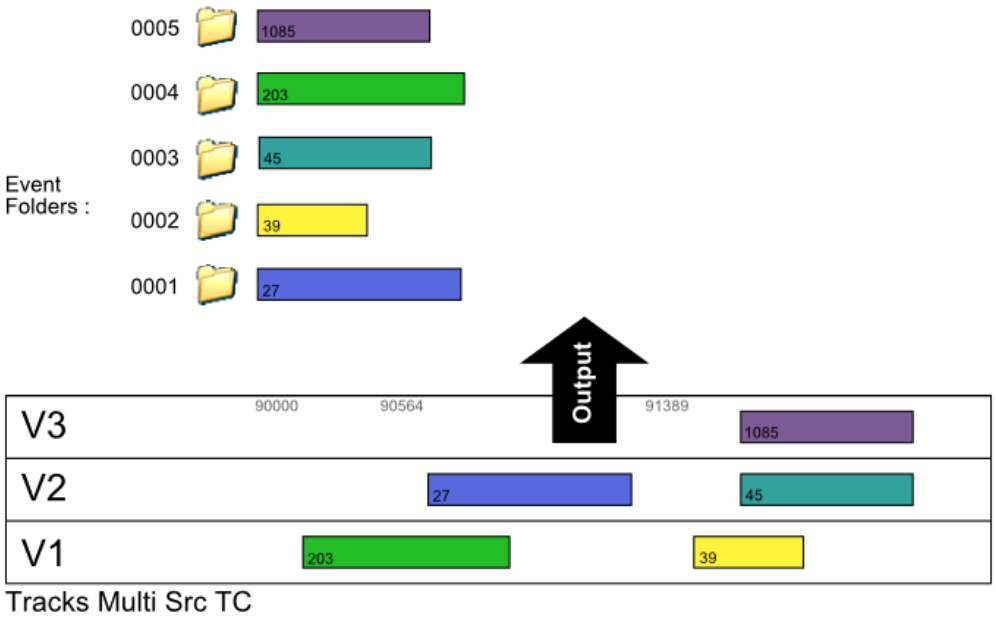
- **Multiple clips** created
  - No BL, AUX or filler
  - Handles allowed. Adjust via *Handle size* slider :

  - **Source** order and timecodes
  - Clips are exported **even if hidden** by other clips.

Example

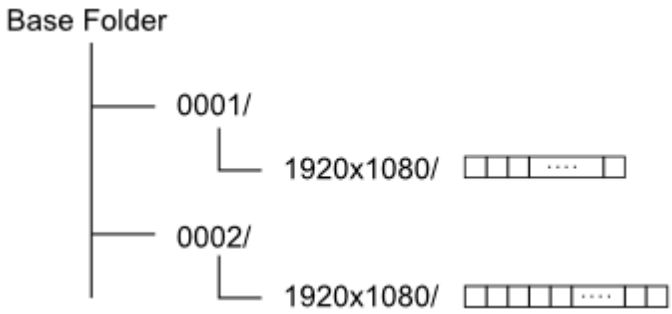
Here, we use *event folders* (see Folder Hierarchy and Variables) to ensure exported shots do not overlap.

> See Multi-Mode Exporting for a description of why multi-mode might cause exports shots to be overwritten sometimes.



Tracks Multi Src TC

Folder Hierarchy, Presets and Variables



The *Folder Hierarchy* panel lets you create a **folder structure** as part of an export process.

> The *Folder Hierarchy* panel does **not** create filenames, only folders. See the Filenaming section for naming exported files.

Folders are created automatically below the current file browser folder (the "base" folder) and can include *shot* names, *tapenames*, *project* name and many other metadata elements (see the Variables section below).

You can create a folder hierarchy on export by :

- Choose a preset from the drop-down list
  or
- Enter a hierarchy definition in the text box (including variables)

> You should consider using a folder hierarchy when doing any *multi-mode* export (e.g. *Visible Multi* or *Tracks Multi*). A multi-mode export may cause exported frames to be over-written. See Export Modes.

Presets

Presets are pre-defined folder structures available in a drop-down list for ease of selection and re-use. When selected, the preset will also be written into the text box and can be edited as required.

A back-slash character ("\") delimits folders.

Manual Entry or Edit

You can create your own folder structure by typing in *preset variables* and other *text strings* in the *Folder Hierarchy* text box.

You can create a **folder structure** by separating the elements with a *back-slash* character "\".

Saving a Preset

Pressing the *Save* button will add your folder hierarchy definition to the drop-down list.

Deleting a Preset

Presets are stored in a plain text file in the application *root* folder :

```
C:\Nucoda\2014_1\root\ExportFolder.prefs
```

```
ExportFolderPresets
[
    Preset "$e"
    Preset "$t\$c\$e"
    Preset "$o$e"
    Preset "$o\$c_$n\$r"
]
```

To delete a preset, **remove it from this file**, save the file and restart the application.

Variables

The following variables are available :

Var	Description	Note
$n	Material name	NONAME used if material name empty.
$e	Event number	See below for the *event number* **format**.
$o	Composition name	NOCOMP used if composition name empty.
$p	Project name	
$r	Resolution.	This will be represented as WidthxHeight in pixels e.g. 2048x1556
$t	Tape name	NOTAPE used if tape name empty.
$c	Clip name	NOCLIP used if clip name empty.
$O	Original material name	NOORIG used if original material name is empty.
$f	Frame number	Replaced with a numeric frame number zero-padded to specified *Frame Padding*.

Event Padding

By default, event folders start at 1 and are zero-padded to 4 digits i.e. folders will be named :

```
0001/
0002/
..
```

You can adjust the start number and default event number padding by editing the *export* section in the main preference file *general.prefs* found in the folder C:\Nucoda\2014_1\root :

```
C:\Nucoda\2014_1\rootgeneral.prefs
```

```
export
{
    eventStart 1
    eventPadding 4
}
```

Export File Formats

Choose a file format to export to, via the format drop-down list at the bottom of the window.

Each available format will offer its own independent set of options via the *Options* button.

Drop-down format list

For a full list of supported formats see the appendix Format Support.

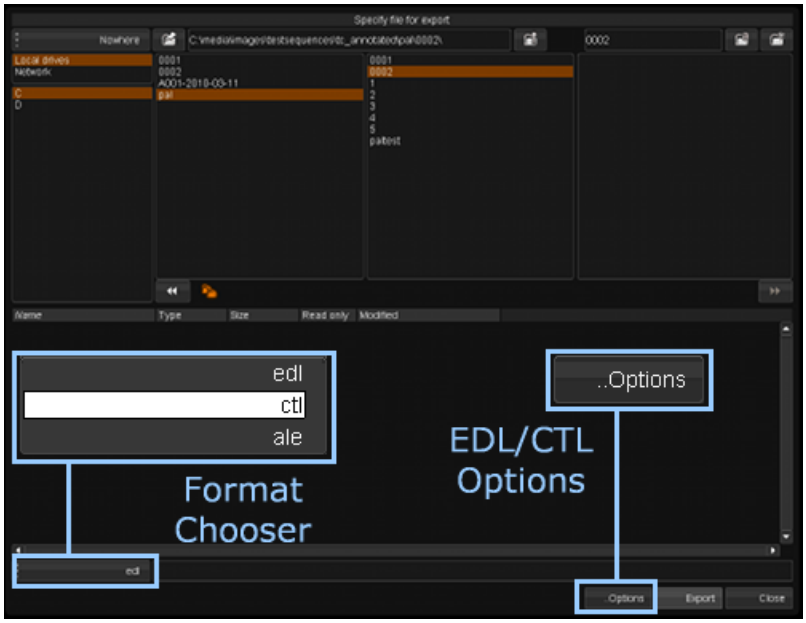
Export Composition

This exports the entire composition as a *list file* (i.e. metadata, not media).

In the *Library*, press the ***..Export Composition*** button to open the *Export Composition* dialog.

Then :

- Use the file browser to *navigate* to the desired location for the list file
- Choose the list *format*
- Set list *options*
- Type a list file *name*
- Press the ***Export*** button



Export Composition dialog

Note that the export **ignores** :

- Marks
- Track enable
- Track visibility

If you want to export *some* shots, not the entire composition :

- **copy** the composition (*Library/Copy*)
- **delete** unwanted shots (with *ripple mode* ***off***)
- **export** the copy.

You can export a *mixdown* of all tracks, or a *specific track* only via the options dialog.

File extensions are added *automatically*.

List Format

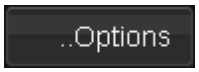
Choose the export format from the format selector drop-down list :

The supported export list formats are:

- EDL (.edl)
- Cut List (.ctl)
- ALE (.ale)

See the appendix for a description of the list formats.

EDL/CTL Options



The ***..Options*** button is available for the EDL and CTL formats.

This will open a new dialog window and let you set various options for the chosen output list format.

EDL Options

Video Mix Down

Selecting *Video Mix Down* will export shots from all tracks with "mixed" down view i.e. shots/cuts as seen from the **top track downwards**.

Solo Video Track

If you have more than one video track, use this drop-down list to select the track to export.

Clip Details

Add extra metadata to each exported shot (e.g. *clip name, file name)* e.g.

```
* FROM CLIP NAME: A005
* FROM FILE: T:\media\images\tc.00000.dpx
* FROM COMMENT: Check this is OK later
```

The **comment** is taken from the shot *description* column in the *Library*.

Cuts Only

This option will only export cuts, no *retimes* or *dissolves*.

CMX Legal

The *CMX Legal* option will disallow the creation of illegal CMX EDL files. The is particularly important with regards to the *tapename*.

A *legal* CMX tapename will have :

- **no spaces**
- **eight characters** or less.

> If you *disable* the CMX Legal option, you will be limited to **36** character tapenames. However, the tapename must still contain no spaces.

When you have adjusted the export properties, close the options dialog and press the ***Export*** button on the bottom right of the file browser window.

> The export progress report will be shown in the main *Library* screen or via the library ***Tasks*** window.

Output Timecodes

The source and record event timecodes can be output as a *timecode* or a *frame* count.

CTL Options

The CTL format has a restricted set of options available (*Video Mixdown* and *Solo Video Track)* with the same meanings as for EDL export above.

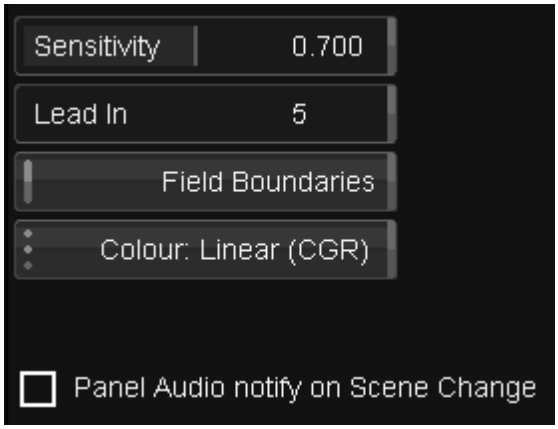
Scene Detection

Scene Detection 11

The Scene Detect module can perform an automatic detection of scene changes in a contiguous segment, adding scene edits where found. When enabled, the detection will begin from the current location of the active play-head.

Setup

To configure scene detection, switch to the ***Scene Detect*** tab.



Parameters

Sensitivity

This numeric slider is for adjusting the sensitivity towards detecting scene changes. The lower the value the less sensitive scene detection is going to be, so changes have to be very obvious to trigger a scene change, whilst the higher the value the more sensitive to changes the scene detector is going to be and smaller amounts of changes will trigger an edit. If this value is too high then edits will be inserted in the middle of a scene, whilst if the value is too low scene changes may be missed.

Lead In

This numeric slider is for specifying the minimum number of frames to leave in a segment before the next edit is inserted, with the default set to 5 frames.
So at its highest sensitivity setting, the scene detector might be detecting scene changes every frame, but it will only insert an edit every 5 frames.

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Field Boundaries

If enabled, edits can also be inserted at field boundaries on interlaced material.

When working with interlaced material scene changes sometimes occur between fields as opposed to between frames, so by turning on this option you allow the scene detector to insert edits where the scene change actually occurs. If this options is turned off, then the edits will be inserted on the frame boundary rather than where the scene change actually takes place.

Colour

Scene detection is dependent on the material *colour format* and especially whether the input is *linear* or *logarithmic*. The default setting will be taken from the project colour scaling setting. Setting the incorrect value here may result in incorrect scene change detection.

See The *Setup Manual* for a discussion of colour scaling.

Panel Audio Notify

Enabling this will cause an audible notification when a scene change is detected. The sound is produced via the control panel.

Usage

Once you have adjusted the settings, switch back to the ***Timeline*** tab and move the active playhead to the start of the segment you want to divide up.

The video track needs to be *enabled* for scene detection to work.

Turn on the ***Scene Detect*** button to start the scene detection process :

You will see the edits appearing on the timeline and a progress report will be shown in the *Library* screen :

To stop scene detection at any point just toggle off the scene detect button.

12

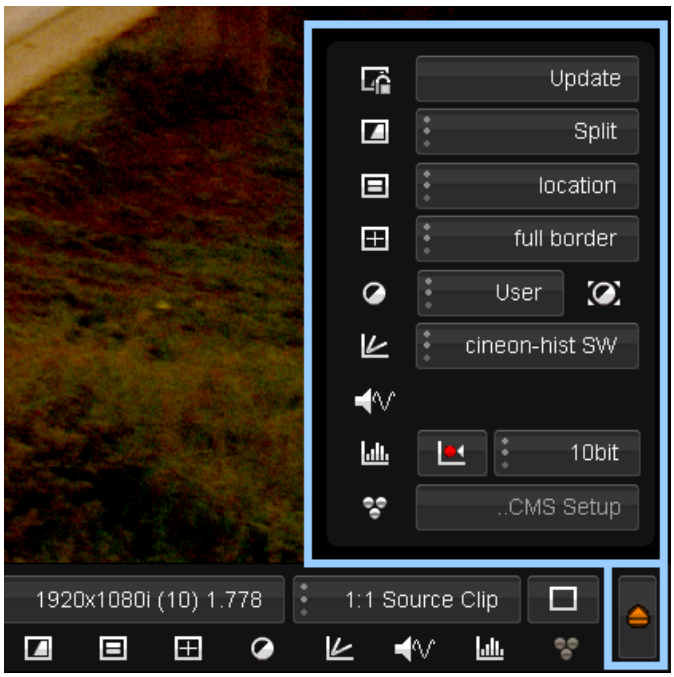
Viewer Tools

2014.1

Viewer Tools 12

The *viewer tools menu* is opened from the project desktop by :

- Pressing the **F12** hot key or
- Clicking the up-arrow button on the bottom-right of the viewer panel as shown below.



viewer toolbox menu

The viewer tools pop-up menu contains setup for the following functions:

- compare mode
- head-up display (HUD)
- grids
- masks
- graphs
- histogram
- colour management system (cms)

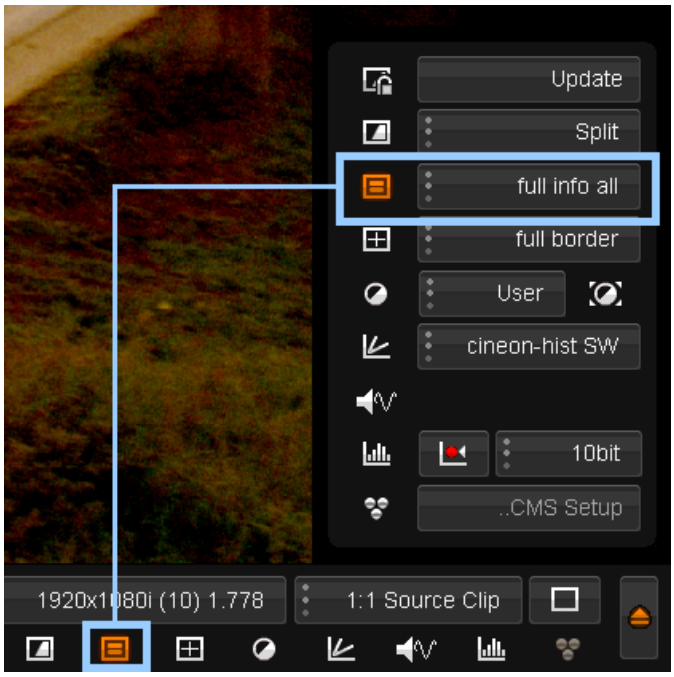
These functions can be turned on/off from within the menu pop-up window, or from the corresponding icons on the desktop once the settings for each function have been selected via the pop-up menu.

Tool Configuration

The available options are *user configurable* for the following tools :

- HUD
- Grids
- Masks
- Graphs

Head-up Display (HUD)



Hot key : F7

The *head up display* (*HUD*) overlays information about the frame/shot being viewed on top of the displayed frame. The information that is displayed is **user configurable** (content and position).

The display of the HUD can be toggled on/off using the ***HUD*** button in the viewer options menu or the hot key **S**.

This is **display only** and is not rendered into any final output.

Options

This drop-down list defines what HUD information to display over the image.

Sample HUD definitions available are:

- location - source and timeline (record) information, in both frames and timecode
- full info all - full information available
- full info BI - full information available inside image area (burnt into image)

full info all

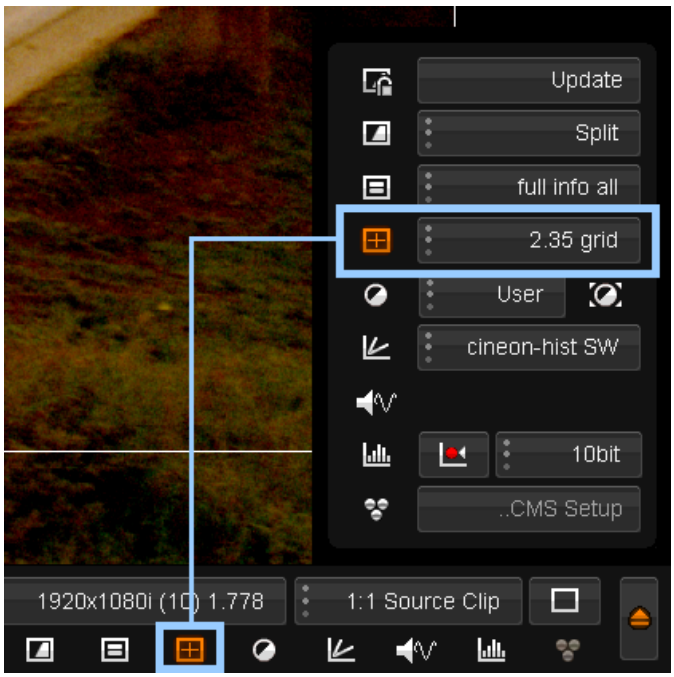
location

logo

Hud Specifications

For the HUD format and specification, see Appendix HUDs Specification.

Grids

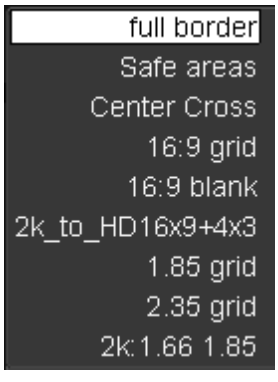


Hot key : F8

The *grids* functionality allows you to apply preset grid overlays to your image. Grids are displayed over the viewed image and are useful for displaying lines, borders and layout information.

This is **display only** and is not rendered into any final output.

Options



This drop-down list defines the grids available to display over the image.

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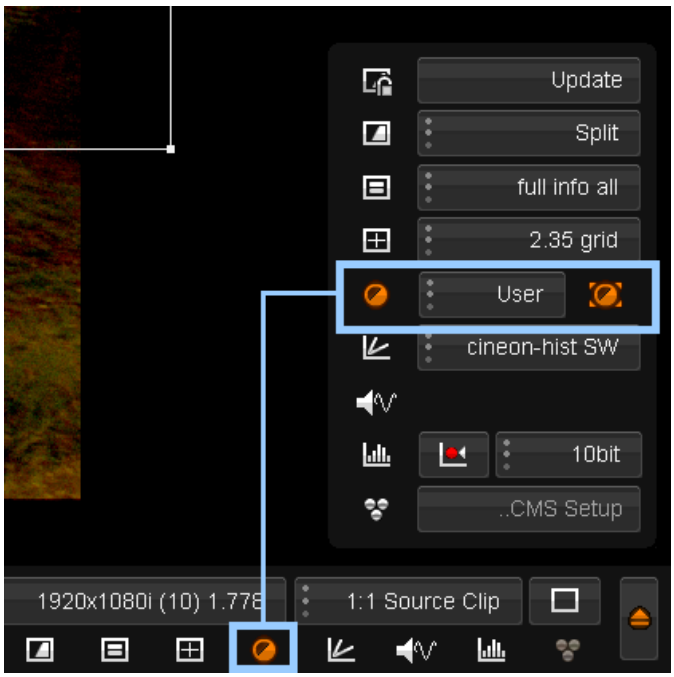
Sample grids included are:

- full border
- 16:9 grid
- 16:9 blank
- 1.85 grid
- 2.35 grid

Grid Specifications

For the Grid format and specification, see Appendix Grids Specification.

Masks



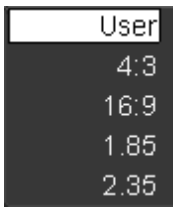
Hot key : F9

Masks crop (black out) rectangular areas of the displayed image.

Press the *masks* button to activate the picture mask function and then select the mask that you want to apply from the drop-down menu.

This is **display only** and is not rendered into any final output.

Options



This drop-down list defines which mask to apply to the image.

Sample masks included are:

- user
- 4:3
- 16:9
- 1.85
- 2.35

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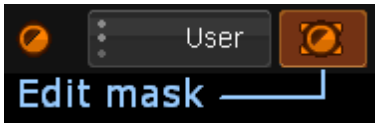
2.35 mask set

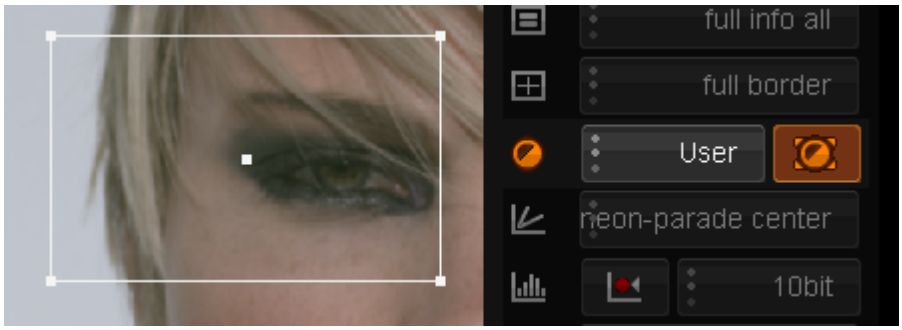
User mask

The *user* mask allows you to interactively draw your own mask over the image.

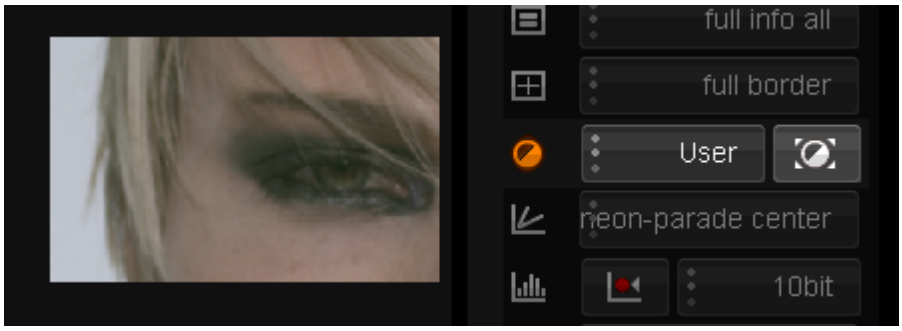
In ***User*** mask mode, press the mask edit button :



A rectangular overlay will appear over the image with handles on each corner. You can *interactively resize* the rectangle to create your mask by dragging each of the corners.



Edit User Mask
Use mouse to drag rectangle corners to resize mask.
Move mask by picking and dragging center point.

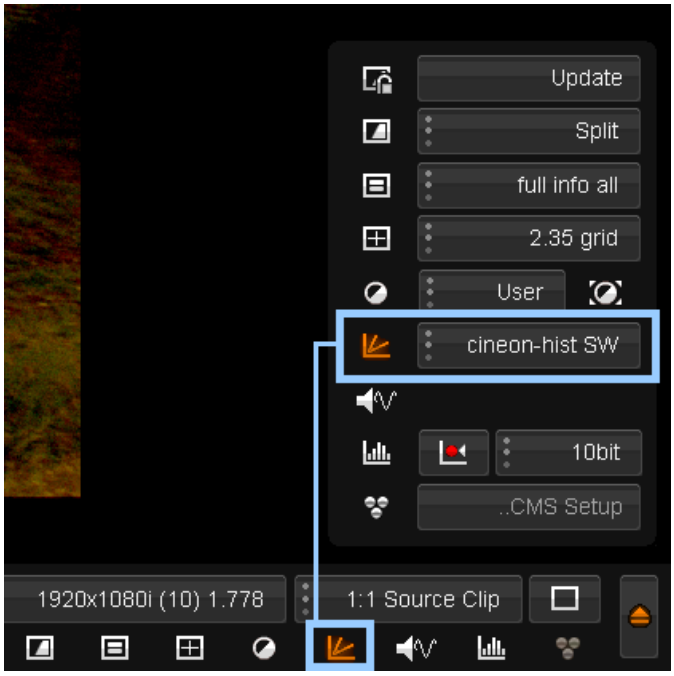


Disable Edit Mode
Turn off edit mode to see mask applied to image.

Mask Specifications

For the Mask format and specification, see Appendix Masks Specification.

Graphs



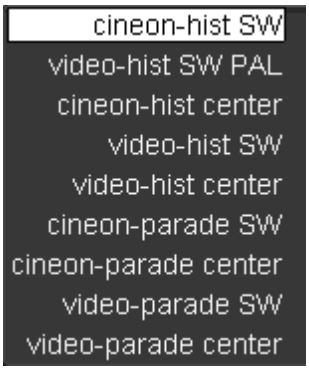
Hot key : F10

The *graph* tool serves three purposes :

- It shows the RGB *response* curves of your shots
- It shows the *value ranges* using dotted lines on the graph (including important value levels)
- It defines how and where the *histogram* graph will be displayed when enabled

This is **display only** and is not rendered into any final output.

Options



This drop-down list defines available graphs and histograms.

Note that graphs ignore the "hist" and "parade" settings, using only the **location** (e.g. center), **size** (e.g. PAL) and **scaling** information (e.g. cineon).

These options are configured via plain text files (*.graphs) located inside the folder specified inside the *general.prefs* file (variable `monitorGraphDir`).

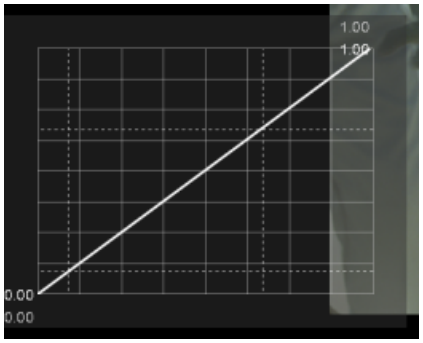
Named sections inside these files specify the listed options above.

Example graph locations are :

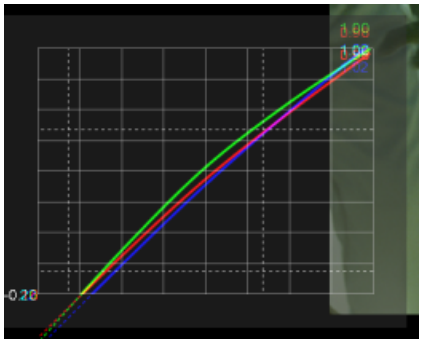
- SW - south-west in image
- Center - center of image

Scaling refers to the dotted-lines overlaid on the graph to indicate important graph data points i.e.

- Cineon - dotted lines at default cineon black and white points (95/685)
- Video - dotted lines at YCrCb SMPTE levels (64/940)



cineon sw

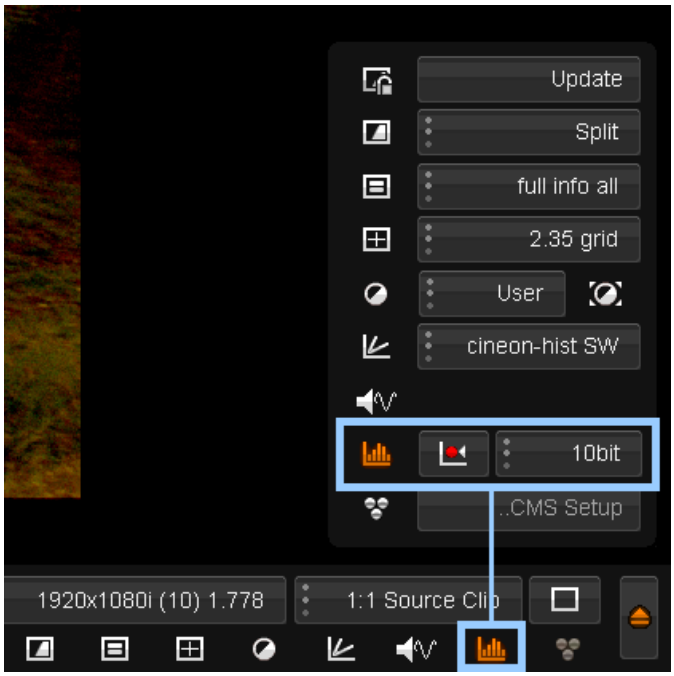


With a grade

Graph Specifications

For the Graph format and specification, see Appendix Graphs Specification.

Histogram



Hot key : F11

The histogram tool displays a graph of RGB colour information :

- For the entire image or
- A selected area of the image

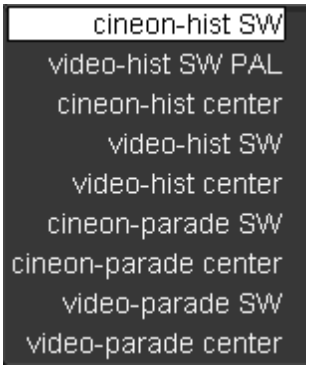
This can be useful in helping identify how much colour correction is needed.

The button on the left activates the histogram, which will be displayed in the manner and location defined by the current graphs setting.

This is **display only** and is not rendered into any final output.

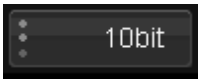
Options

The available graph positions and types are as per the graphs.



Unlike the Graphs settings, the *Histogram* settings can be set in a *histogram* mode (RGB values overlaid) or a *parade* mode (RGB values separated in columns).

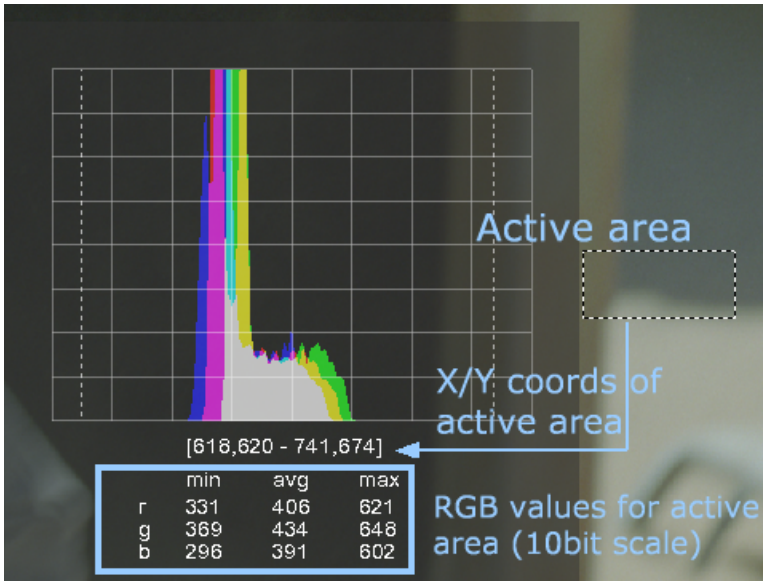
Setup

Graph Setup	
	Toggle display of graph.
	Reset graph active area to default (whole image)
	Set the scale to use for the reported graph values. Values : 8,10,16 bit or 0-1. **Default :** 10bit

Area Selection

By default, the histogram will display RGB values related to the entire image.

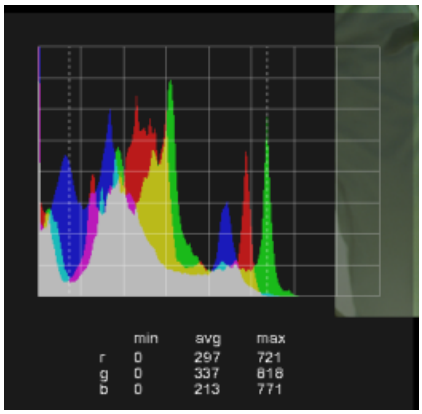
You can select a region of interest with the mouse interactively.



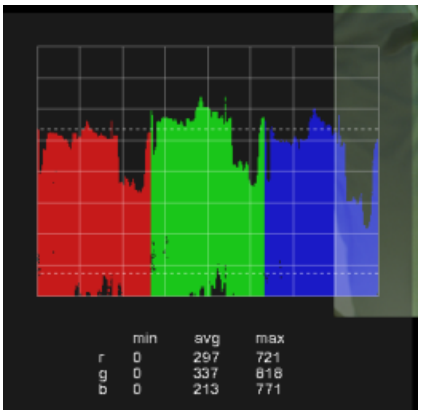
You can also click anywhere on the image to display information about a single pixel.

Display Modes

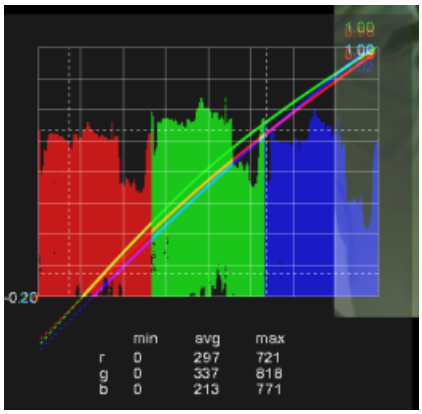
Histogram



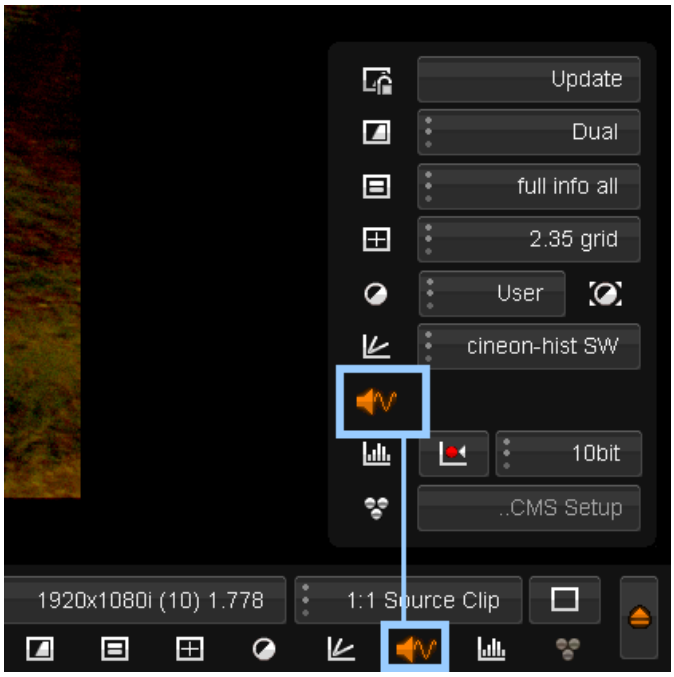
Parade



Note that you can display graphs (colour curves) and histograms (or parades) **simultaneously**.



Audio Waveform



The *Audio Waveform* button displays the audio segment waveform overlaid on your monitor output. The waveform will update *dynamically* as the segment plays.

Audio segment waveform shown overlaid on monitor

Handy Hotkeys

icon	hotkey	function
	F12	Toggles the viewer options panel on/off.
none	*Ctrl + 5*	Saves a snapshot of the current image as a reference image
none	*5*	Toggles the compare source, between dynamic selection and the reference image
	F6	Turns compare mode on/off
none	*Shift + F6*	Changes the compare mode (wipe/dual/ cut)
none	*Ctrl + F6*	Changes to the next dynamic compare source
	F7	Turns the Head Up Display (HUD) on/off
none	*Ctrl + F7*	Changes to the next HUD definition
	F8	Turns Grids on/off
none	*Ctrl + F8*	Changes to the next Grid definition
	F9	Turns Masks on/off
none	*Ctrl + F9*	Changes to the next Mask definition
	F10	Turns Graph Curves on/off
	F11	Turns Histogram on/off
	Shift + F11	Resets Histogram
none	*Ctrl + F12*	Changes to the next Histogram/Graph definition
	Ctrl + F12	Turns CMS on/off

13

Comparison Mode

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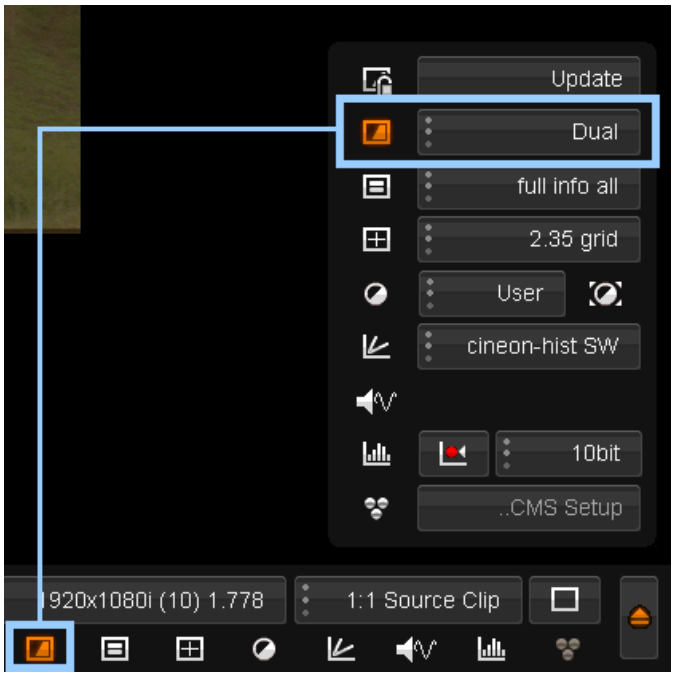
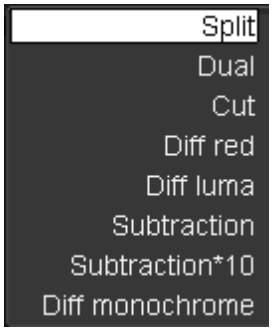
Comparison Mode 13



Hot key : F6

The *compare* function allows you to compare the frame you are viewing against other instances in your timeline, against a reference frame, or against different versions of the frame itself.

Compare Modes



The *Compare* options are selected via the drop-down list on the right-hand menu. Show this menu using the **F12** hot key. The options listed inside a project may be a *subset* of the total available because you may want to limit those you can cycle through. The options available in this list is configured in the Control Panel preference section.

Split mode. You can interactively change the split using the mouse or panel.

Dual mode. Comparison side-by-side.

Split

Selecting split mode will allow you to wipe between the currently active frame in the viewer and your comparison image.
An *overlay control* will appear in the viewer, separating the two frames. This control can then be manipulated interactively by dragging it in any arbitrary direction, to make comparisons between the two images. It is also possible adjust the overlay during playback.

Dual

Selecting dual mode will display **two** images in the viewer. The currently active frame will appear on the left, and next to it on the right will be your choice of comparison image.

Cut

Selecting the cut mode will allow you to toggle between the current frame and your comparison image in full size. Only one image will be displayed at a time, determined by pressing the compare button on/off. When the compare button is *off* you will see the current frame, as normal, and when the compare button is *on* you will see the comparison image.

A full screen compare can be achieved by taking a *snapshot* of the current image and moving to a new frame for comparison. Press **CTRL + 5** to grab the current image. Holding down the **5** key at any future time will display the *snapshot* frame in place of the current image in the monitor.

Difference Modes

There are 3 *difference* modes:

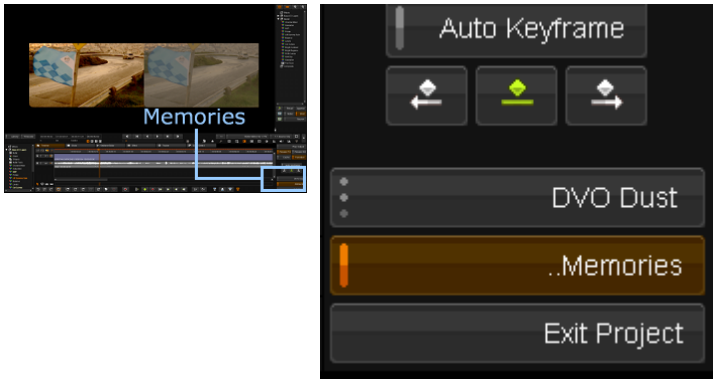
- Diff red
- Diff luma
- Diff monochrome

Each one will show you the difference between the current frame and the comparison frame in the specified colour.

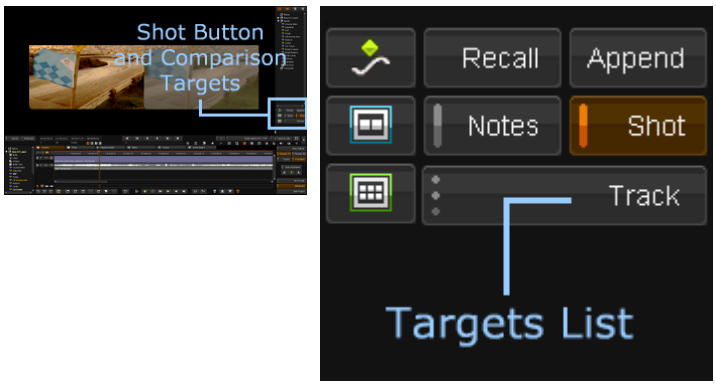
Comparison Image

Once you have selected your compare mode, you can close the viewer tools menu (**F12**) and bring up the *Memories screen* to select what we will compare against.

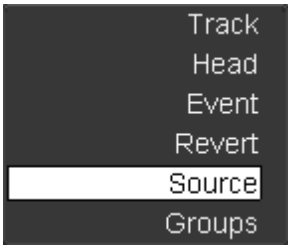
Select the ***..Memories*** button :



Select the ***Shot*** button :



Choose a *Comparison Target* from the drop-down list below *Shot* :



You can compare against targets :

- **Track** - the track below
- **Head** - the secondary play-head
- **Event** - a selected event
- **Revert** - the previous grade on the shot
- **Source** - the segment source
- **Groups** - a selected group member

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14

Stereo Multitrack

2014.1

Stereo Multitrack 14

A *Stereoscopic* mode can be enabled on a per project basis. This allows both the **display** and the **grading** of stereo left and right channels.

Setting Up Stereo

For stereo support, you need to :

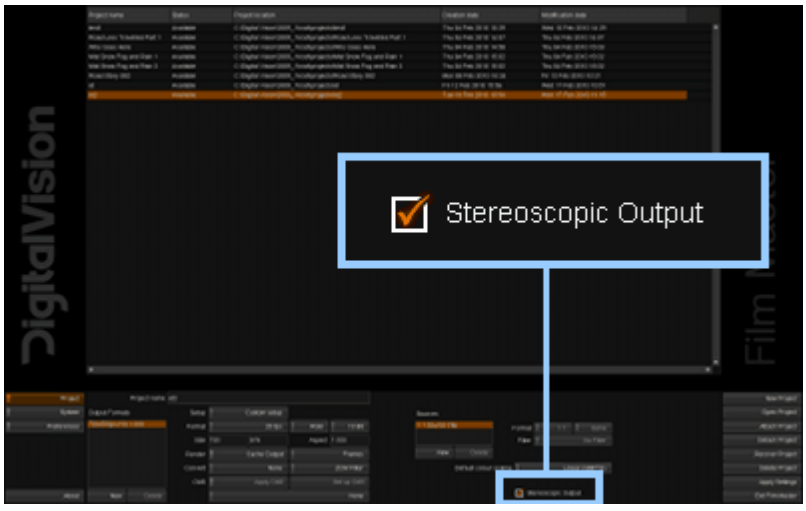
1. Enable a project setting and
2. Choose your stereo mode (if using an interlaced DVI device).

DVS Centaurus II Licensing

You will need the *DVS Centaurus II* license option ***Multidevice*** to use stereo multitrack mode SDI output. See the *DVS Centaurus II Video* section of the *Setup Manual* for more information.

Project Setting

Stereo is enabled independently **per project**. To enable stereo on a project, select the project on the main project screen and select the *Stereoscopic Output* tick-box :



Application Preferences

Two modes of stereo channel output are supported, **SDI video** and **interlaced DVI**.

SDI

Output of left and right stereo on **SDI** channels A and B through a *DVS Centaurus II* video board.

You will need to enable your SDI I/O card via :

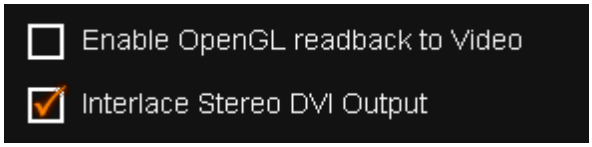
Preferences / Monitoring/VideoIO : Enable SDI I/O Card

Interlaced DVI

Output of *interlaced stereo* through **DVI** to a supported display device.

If your stereo display device uses an *interlaced DVI signal*, enable this via :

Preferences / Monitoring/VideoIO : Interlace Stereo DVI Output

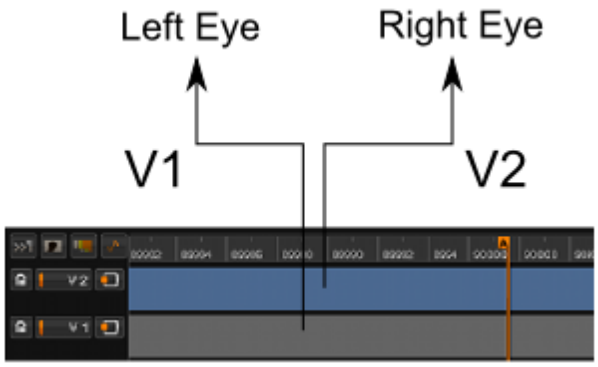


Interlaced Stereo mode is incompatible with OpenGL read-back and will be hidden if read-back is enabled.

Using Stereo

If *Stereoscopic Output* is enabled for a project, stereo display output will be sent to the configured stereo display device (SDI or DVI) automatically.

Composition tracks **V1** and **V2** will both be sent to the display device as the left and right stereo channel.



Stereo channel **SDI output order** :

Track	Stereo	SDI Output
V1	Left	A
V2	Right	B

You can *reverse* this order via the toolbar button :

or by changing the *general.prefs* parameter :

`reverseStereoOutput`

This parameter is inside the `IOCard` section of the preference file.

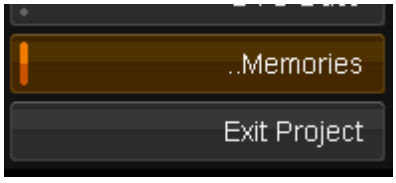
Viewing

You can view and compare the two stereo channels by choosing a compare mode between the two tracks. Compare modes are described in the Comparison Mode section.

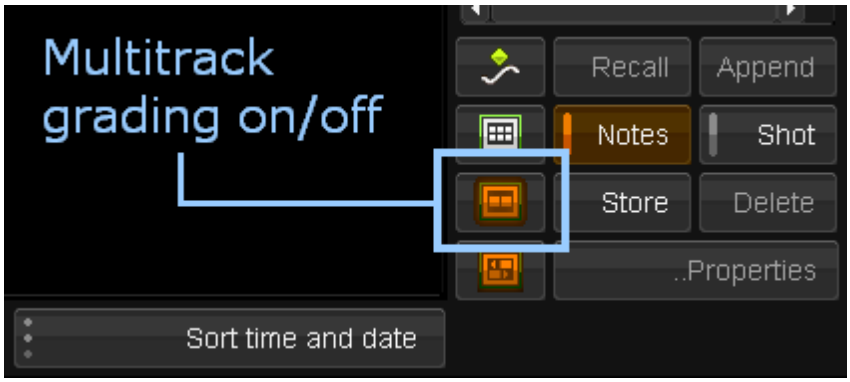
Multitrack Grading

You can grade **both stereo channels** at the same time (and apply notes to both channels) by enabling *Multitrack Grading*.

Switch to *Memories* mode :



Then, switch to *Shots* mode and enable *Multitrack Grading* using the button shown below :

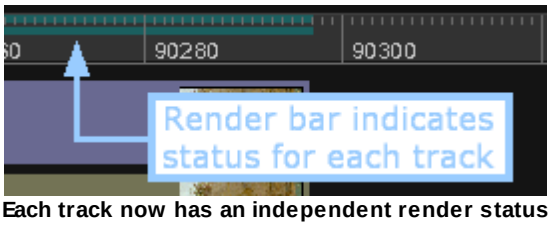


Shots that are grouped into *multitrack mode* are shown with green triangles on their right-hand edge :

Multitrack shots shown in group

Note that *multitrack* mode will only enable (on both tracks) if the two tracks are the **same length**.

The *render indicator* bar also shows the render status of each track separately :

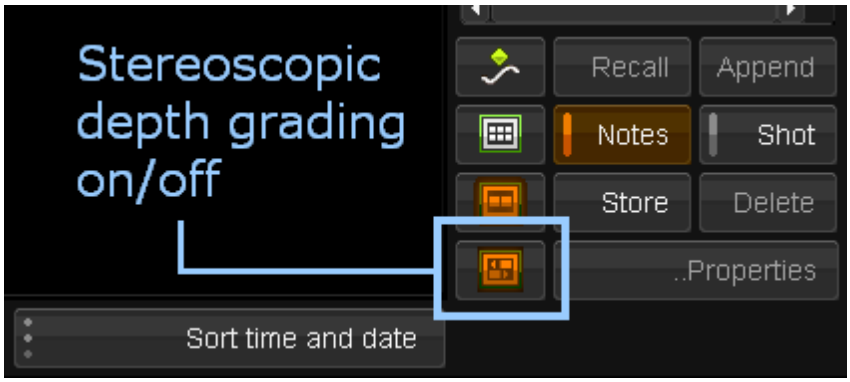


Each track now has an independent render status bar

Grades will now be applied to both the top and bottom tracks.

A grade will only be applied to a **monitored track** :

Stereoscopic Depth Grading



The *Stereoscopic Depth Grading* button will cause **Pan, Tilt and Rotate** Pan/Scan transforms to be applied normally on the top track but in *reverse* on the track below.

This can easily be seen in the track *thumbnails* as shown below :

Track thumbnails show that top track has positive pan. This is reversed on the bottom track.

15

Colour Management

2014.1

Colour Management 15

Hot key : CTRL + F12

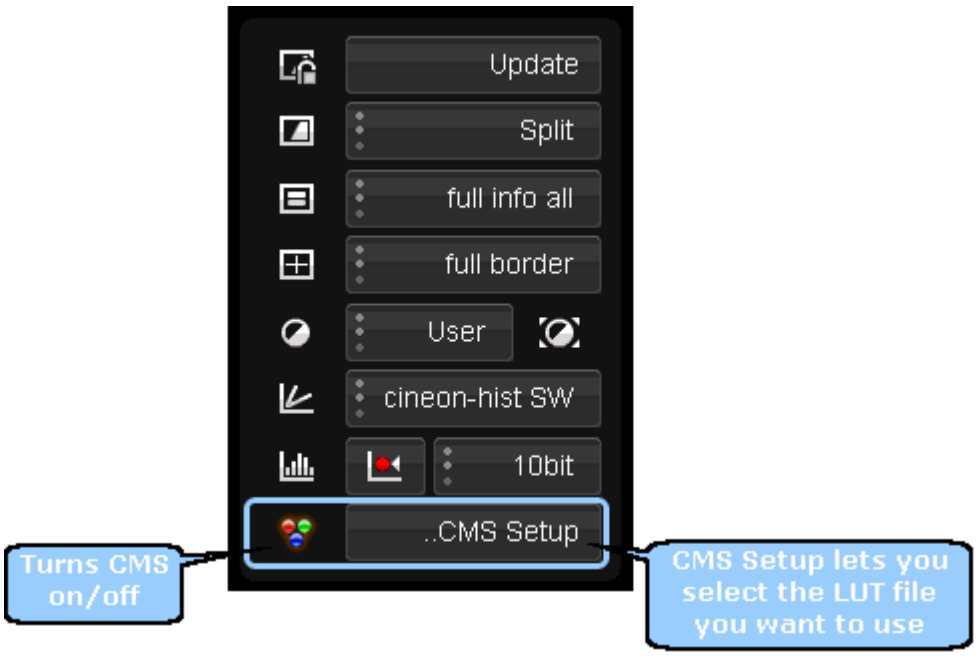
The *Colour Management System* (CMS) lets you apply colour transformations to your shots. These transformations are user configurable and defined in a *3D colour cube file* which is loaded into the application on demand, or specified as part of an project output format.

To use a CMS *Look Up Table* (LUT), you need to define the project LUT type on the main project setup screen.

Some samples colour cubes have been provided.

If CMS was not selected for the output format that you are viewing then the CMS option will appear disabled in the viewer tools menu. To activate the CMS option you can simply exit your project, add CMS to your project configuration, then re-open your project.

Once you have activated the CMS option, you can apply the CMS by pressing the CMS toggle button in the viewer tools menu:



Alternatively, you may have chosen to *'burn-in'* the CMS to your output format (via the project configuration options) in which case the CMS will be permanently applied and you will not be able to toggle it on/off.

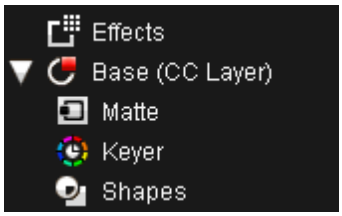
If you want to change the colour cube that you are using, you can use the ***.. CMS Setup*** button to select a different LUT file.

16

Effects

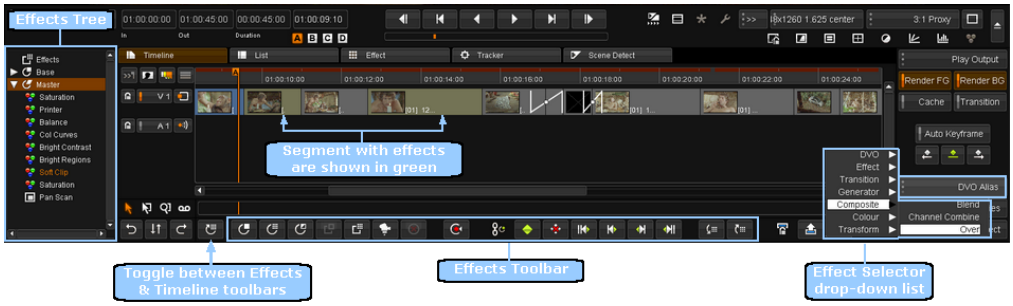
2014.1

Effects 16



A variety of colour correction tools and effects are available, each of which can be applied independently to individual segments on the timeline.

Since each segment can have a different set of effects, the *effects tree* to the left of the composition editor will always show all the colour correction layers and effects that can be applied to the active segment on the timeline:



As the active segment changes, the effects tree will change to show only the effects corresponding to that segment.

> A *selected* segment is orange, but this does **not** override the ***active*** segment with regards to the effects tree.

By default, only the basic colour correction layers appear in the effects tree. These are the *Base* layer and the *Master* layer. Additional colour correction layers and effects can be added using the *effects toolbar*, which runs along the bottom of the composition editor.

Segments that have had grading/effects applied are differentiated on the timeline from those that haven't by having a lighter segment colour; i.e. segments with effects are whiter than the grey segments without effects.

In addition, if you have thumbnails enabled, the thumbnails in each timeline segment will show the first and last frames of the segment with the effects that have been applied.

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The following effects operations will be covered in the next sections:

- colour correction layers
- editing effects
- managing effects layers
- adding user effects
- transition effects

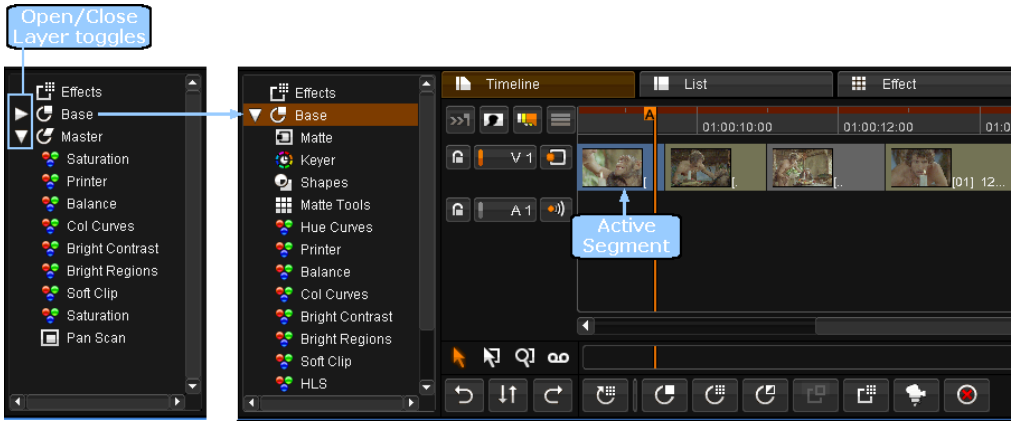
Colour Correction Layers

Every segment has two colour correction layers available by default, the *Base* and *Master* layers.

- The *Base* layer is a fixed colour adjustment layer at the beginning of processing
- The *Master* layer is a fixed colour adjustment layer at the end of processing.

The *Base* layer also contains *isolation* effects, whilst the master layer does not.

These layers are displayed in the *effects tree,* and as the *active playhead* changes segment the effects tree updates to list the effects available for the *active segment* on the timeline. To expand an effects layer, click on the arrow toggle button next to the layer name:



You can control the effects that are available in the base and master layers and the order that they appear in the effects tree (which is the order they are processed in) by editing the following lines in the main preference file *general.prefs* (See Appendix Application Preferences) :

- `defaultRealTimeEffectIDs` - effects available in *Master* layer
- `defaultSecondaryCCEffectIDs` - effects available in *Base* and *CC Layers*

Not all effects are necessarily available by default, and you can add/remove

effects from either layer by adding/removing the appropriate IDs from the preferences file.

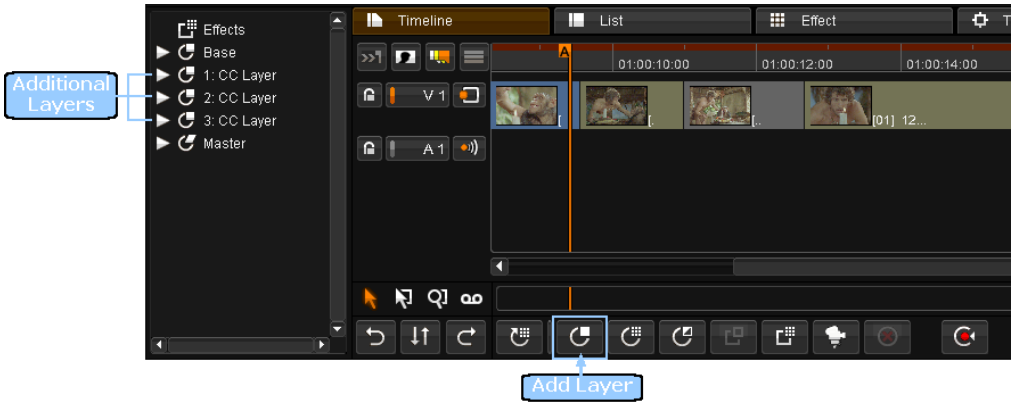
See appendix Effect Identifiers for a list of available effect you can use in these preference settings.

Effects Layer

The *Effects* layer, at the top of the effects tree, contains no effects by default. When you add user effects to a segment they will be listed here.

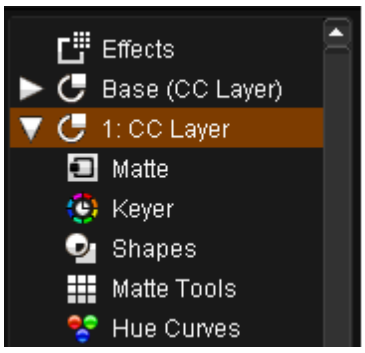
Additional Secondary Colour Correction Layers

Additional colour correction layers can be added to the active segment by pressing the ***Add Layer*** button on the *effects toolbar*. This will add the layers to the effects tree. The layers are numbered from 1 according to their position within the effects tree:



These additional layers will have the same set of effects available as the base layer.

You can add an *unlimited* number of secondary colour correction layers and each contains shapes, keys and mattes :

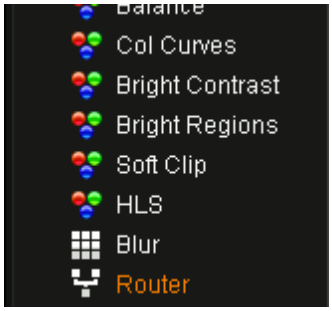


Layers are always added to the ***active segment*** only, they are not added to selected segments or any other segments.

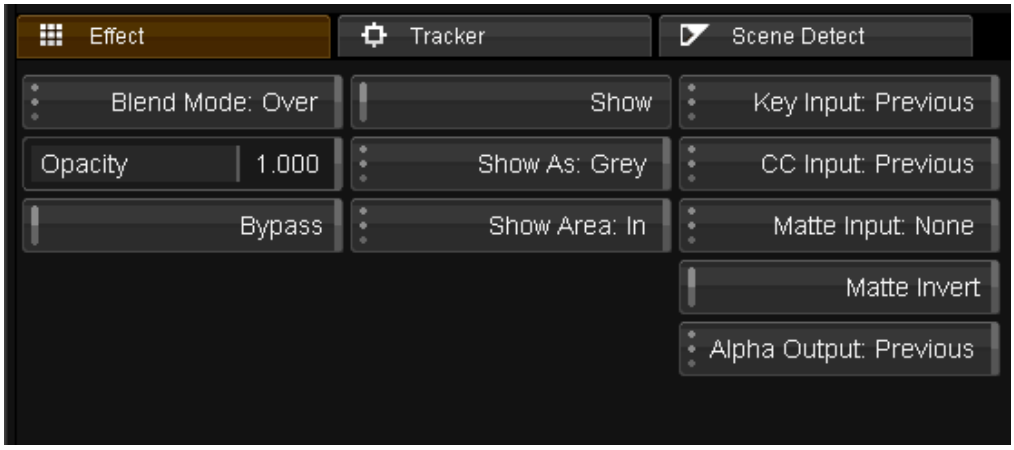
Rename a CC Layer by selecting it and pressing the **F2** key.

Layer Router

It is possible to use the layer *router* (at bottom of every layer) to set various layer specific parameters, including how layers are composited (blended) on top of each other.



The Router has an effect tab containing the parameters available.



It is possible to change the layer opacity, or bypass the layer completely.

Blend Mode

The layer router includes a *Blend Mode* that controls how the layer is *composited* over layers below. It has the following settings :

- Over
- Add
- Subtract
- Dodge
- Burn

- Lighten
- Darken
- Hardlight
- Softlight
- Screen
- Overlay

These modes will be familiar to *Adobe Photoshop* users.

Managing Layers and Effects

Re-ordering Layers

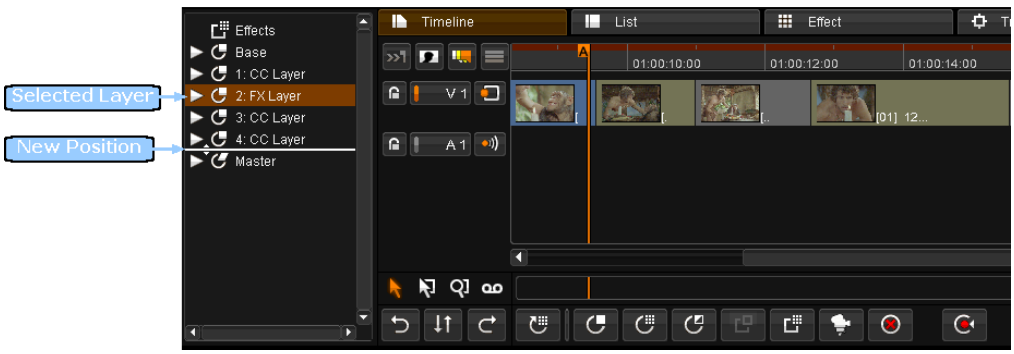
You can re-arrange any layers and effects that you have added to the effects tree, not including the default 'effects', 'base', or 'master' layers.

Effects are processed top-down as they appear in the effects tree, so by re-ordering effects you are changing the order that they are processed in.

By default, any *user effects* that you add are placed above the colour correction layers in the 'effects' layer. If you want to be able to place user effects in-between the colour correction layers, you just need to add them as *layer effects* instead. These two options are covered in the adding effects section.

To re-order a layer :

1. Select the layer (it is highlighted)
2. Hold down the mouse left button and drag the layer up/down the effects tree (an orange guideline appears)
3. Release the mouse button when repositioned correctly.



4. When you've reached the place where you want to place the layer simply let go of it with the mouse. All the other layers will

automatically shuffle down and be renumbered accordingly.

You cannot place any effects after the 'master' layer. The master layer is always the last layer in the pipeline.

Renaming Layers

To rename a CC layer :

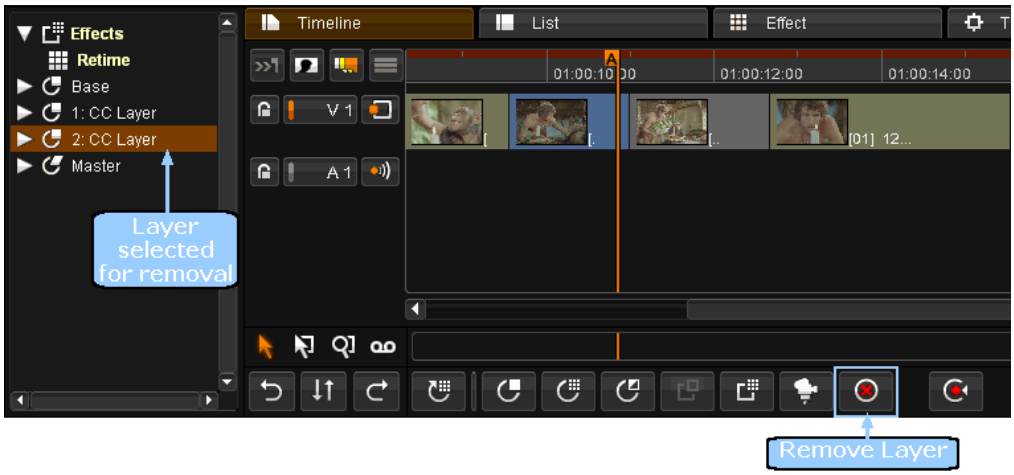
1. Select the layer (it is highlighted)
2. Press the **F2** hot key to edit the layer name
3. Rename the layer and press ENTER when done.

You cannot rename the *Base* or *Master* layers.

Deleting Layers

To delete a layer :

1. Select the layer (it is highlighted)
2. Press the *Remove Layer* button or the keyboard DELETE key



The effect/layer selected is removed from the active segment, so make sure that your active playhead is positioned over the correct segment when carrying out this operation.

You cannot delete the *Effects* layer or the *Master* layer.

You can delete the *Base* (CC layer) but the first CC layer created afterwards will become the new *Base* layer. If you use CC layers, the first will always be the *Base*.

You can use the control panel *Undo* button, or press **CTRL+Z** on your keyboard to revert mistakes.

> If you have multiple colour correction layers, numbered 1 - N, and you remove one of them, the remaining layers will be renumbered to reflect their position within the effects tree.

Applying and Editing Effects

The colour correction layers in the effects tree are by default inactive and will not be applied to the corresponding segment until you edit the parameters of one of the effects within the layer.

User effects and layer effects on the other hand, are often active by default and are applied to the corresponding segment from the moment that they are added.

You can adjust the parameters of any effect, whether active or inactive.

To edit an effect, double-click on the effect name in the effects tree to edit it. The composition editor panel will automatically switch to the ***Effects*** tab to show the parameters for the chosen effect

> The currently edited *Effect* will be **orange**.

View Output

Hot key : w

In addition, the view mode will automatically switch to ***Play Output***. In this mode, any changes to the effect parameters are rendered automatically and the resulting output image is displayed in the viewer. This output image is the cumulative result of all the effects that have been applied to that segment, i.e. the full effects tree.

View Selected

Hot key : e

You can change the view mode from ***Play Output*** to ***Play Selected*** by

Using the drop-down list selecting the option from the view mode drop-down list or by holding down the **CTRL** key when you **double-click** on an effect to edit it.

In this mode, you will not see the cumulative result of all the effects in the effects tree but will see only the cumulative result up to the effect that you are currently editing.

Further to this, if you are editing an *isolation effect*, i.e. matte, keyer, shapes, or blur, you will only see the cumulative result of the isolation effects in that particular layer.

> In *View Selected* mode, the effect that you are editing will appear in **yellow** in the effects tree:

Once an effect has been edited, it appears as **bold** in the effects tree, as does the layer that it belongs to:

> The **bold** indicator in the effects tree signals that the effect has been *edited*, not that the effect is active. User effects can be active by default and will not appear bold unless the effect parameters are edited.

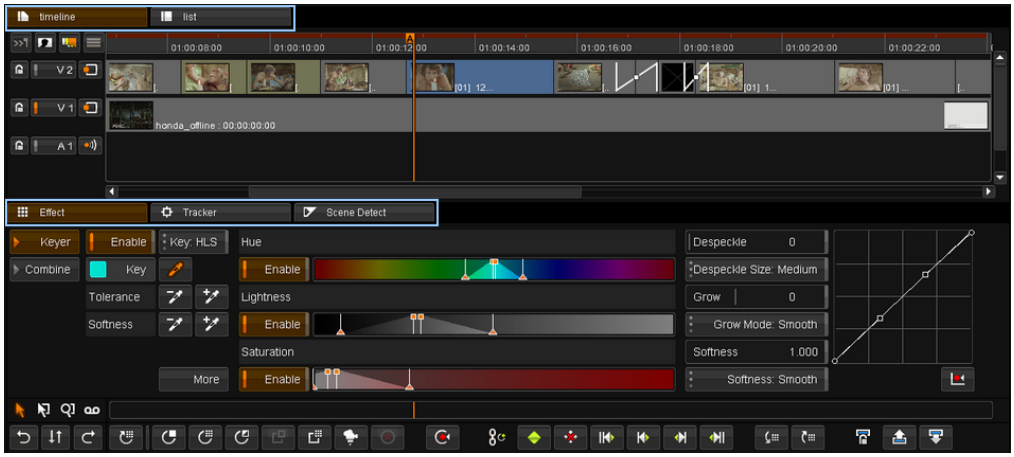
You can reset an effect back to its original parameters by selecting the effect, so that it's highlighted, and pressing the ***Reset Effect*** button on the effects toolbar. You can also reset an entire layer, which will recursively reset all the effects within the layer.

Split Panel View

Hot key : CTRL + F4

When editing effects it can be useful to view the timeline, or the shot list, at the same time as you're editing the effect parameters. You can do this using the *split panel view*.

This will switch the composition editor display to an extended panel mode and will split the tabs so that you have the 'timeline' and 'list' tabs available across the top and the 'effects', 'tracker' and 'scene detect' tabs along the bottom:



You can then click on the tabs as normal to change the combination, e.g. to view the shot list and effect parameters:

Adding User and Layer Effects

You can add individual effects to any segment in your composition in addition to the existing colour correction layers. These effects can be added in two ways, as *user effects* or as *layer effects:*

User effects are added to the *Effects* layer at the top of the effects tree.

> Except *Composite* effects which are added at the bottom of the effect tree (below the *Master* layer).

Layer effects are added as new layers in the effects tree. These may be *Colour Correction layers* (CC Layer/Base) or *Effect Layers* (FX Layers).

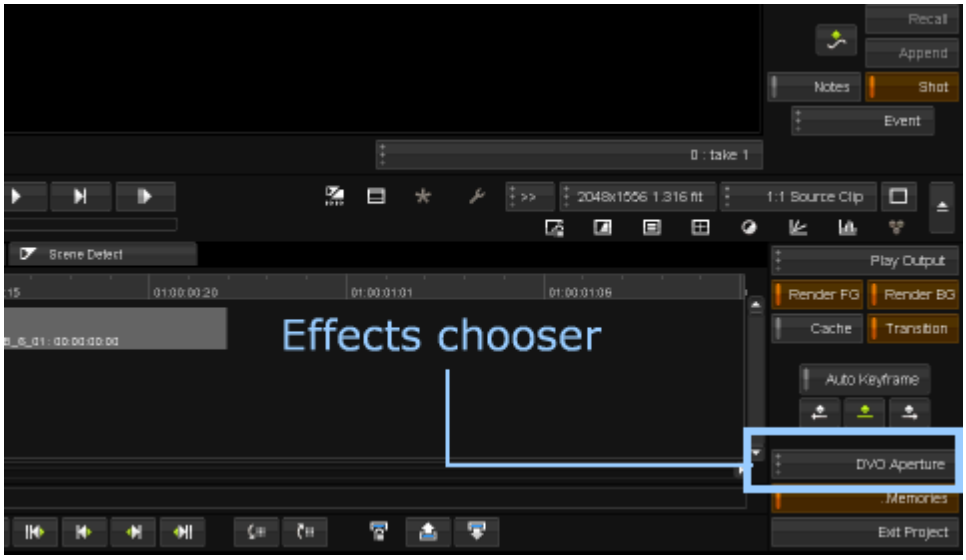
The benefit of layer effects is that you can change the position of the layer within the effects tree and therefore the order that it will be processed in, since effects are processed top-down based on their order in the effects tree. User effects can only be ordered within the effects layer and the position of the effects layer cannot be changed.

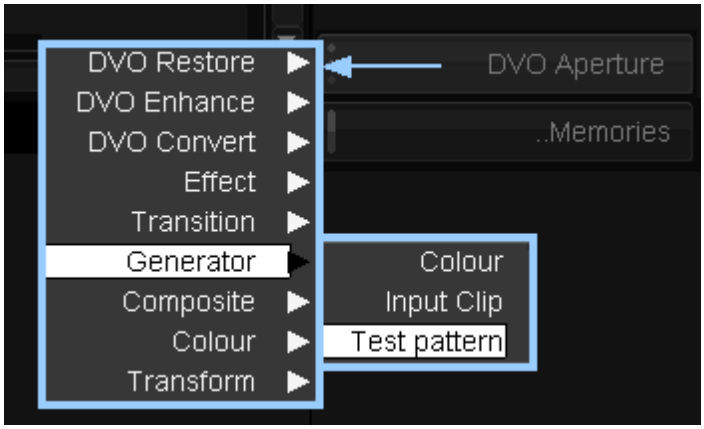
As when adding colour correction layers, layer effects are only added to the

active segment. This is because the effects tree of each segment can be different, i.e. have a different number of layers and effects, and layers are added at a specific position within the tree, i.e. under the currently selected layer.

However, *User Effects* on the other hand are added to **all selected segments**, and only when no segments are selected is the effect added to the *active* segment.

The effects available are accessed via the *effects list* drop-down menu button on the right of the work area panel:



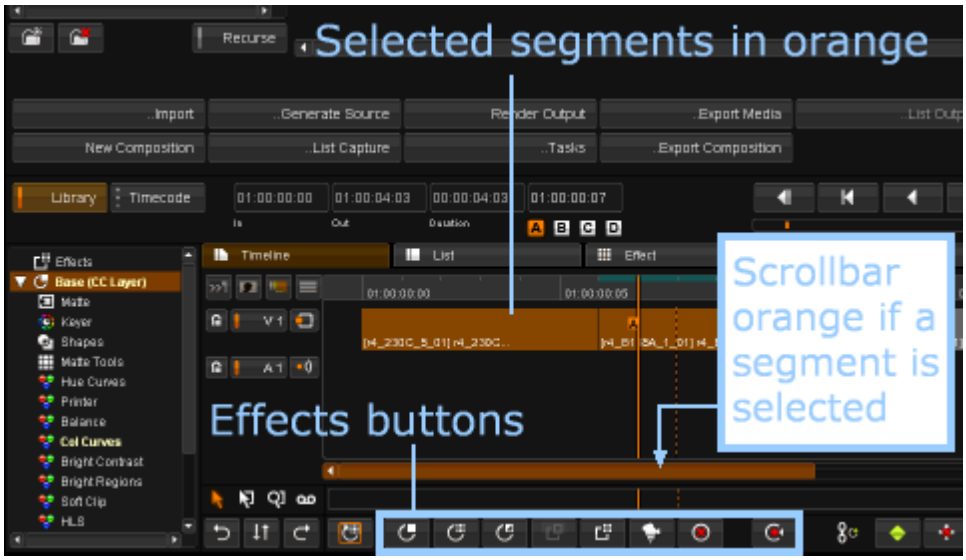


To add an effect you need to select the effect from this list. The selected effect will be shown as the button label once the list is closed. Valid effect addition buttons will be enabled on the effects toolbar.

Next, select the segment(s) that you want to add the effect to.

To select **multiple** effects, hold down the **CTRL** key on the keyboard while clicking them (refer to the section on selecting timeline segments for alternative methods).

By selecting segments you are overriding the active segment, so if you want to also add the effect to the active segment you have to select it. Selected segments are in **orange**.



If any segment is selected on your composition, the scrollbar is also shown as orange.

Changing the scrollbar colour to orange means that you can see if a segment is selected even if it is not visible. This can prevent accidental effect application to the wrong segment.

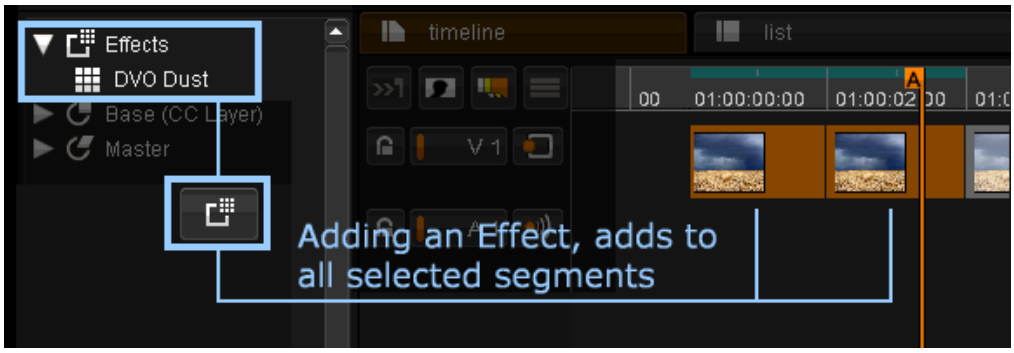
At the bottom of the main screen are the buttons that control effect addition, deleting and parameter reset.

Icon	Action
	Add *CC Layer*
	Add *FX Layer*
	Add *Inverted CC layer*
	Add *Composite Layer* Note that this is active only if a *composite* effect is chosen

	Add *User Effect* (to Effect layer at top)
	Add *Restoration* Effect. This is a **DVO Dust+Fix** *Effect* layer
	Delete Effect or CC/FX Layer
	Reset Effect or CC/FX Layer parameters

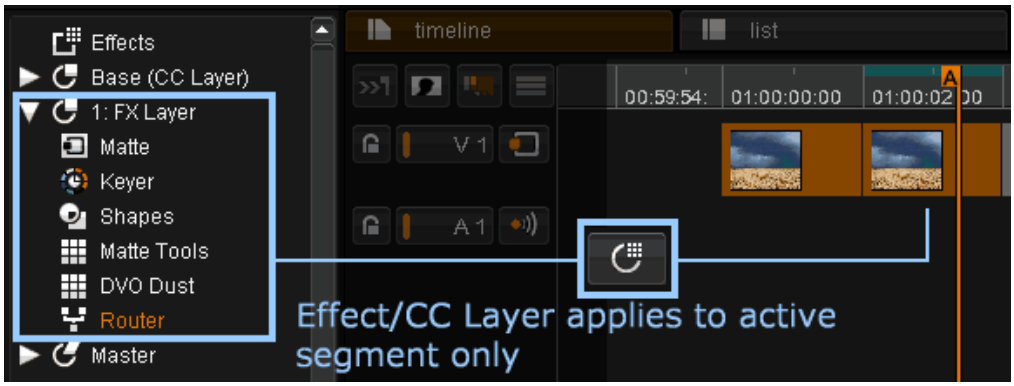
User Effects

Adding the effect as a user effect will add the effect to **all the selected segments**. The effect will appear in the ***Effects*** layer of the effects tree:



Layer Effects

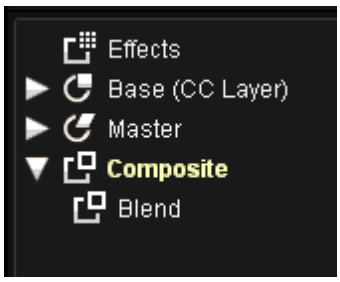
Adding the effect as a layer effect will add the effect only to the active segment, ignoring other selected segments. The effect will appear as a new layer in the effects tree:



The effect layer will have the applied effect, as well as all the *isolation* effects ('matte', 'keyer', 'shapes', 'blur') and 'router' which are present in all layers.

Composite Effects

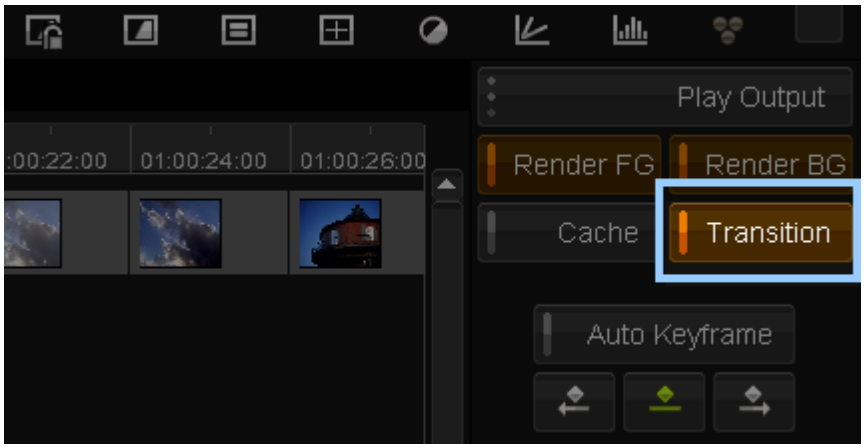
Like an normal *Effect*, a *Composite* effect is added to **all the selected segments**. It appears at the bottom of the effect tree.



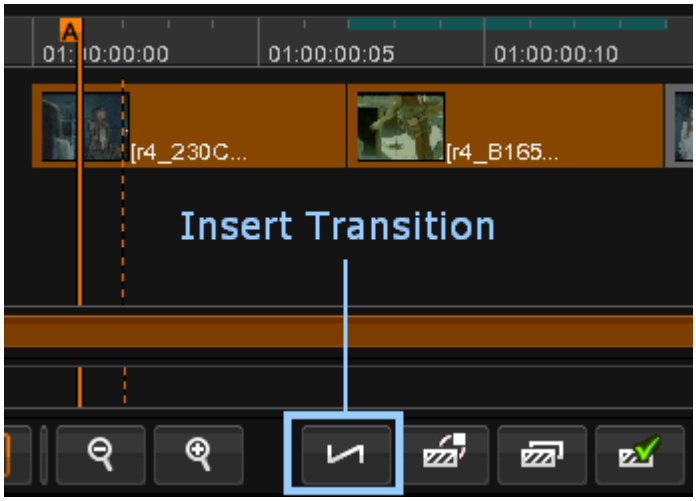
Transition Effects

Transition effects can be added manually between two adjacent segments on the timeline. An imported EDL may also include transitions between shots.

Enable the ***Transition*** button - transitions will not be rendered and displayed unless the ***Transition*** button is enabled.

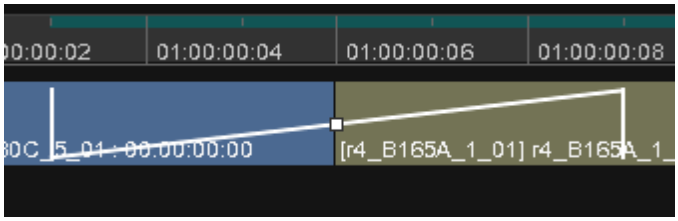


Select two adjacent segments on the timeline (hold down the **CTRL** key whilst clicking on the segments) and press the *Insert Transition* button on the timeline toolbar:



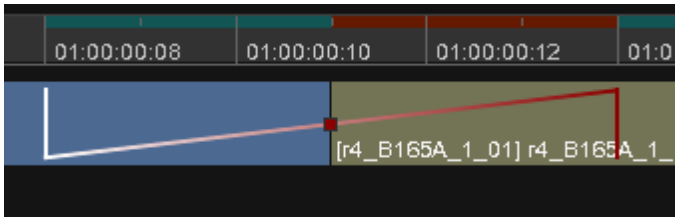
Valid Transition

A valid transition will be shown in **white**, as a diagonal line between the two segments, with a vertical line on the start and end frames.



Invalid Transition

If there is not enough material for the transition as set (insufficient *handles*), then that part of the transition will be displayed as red :

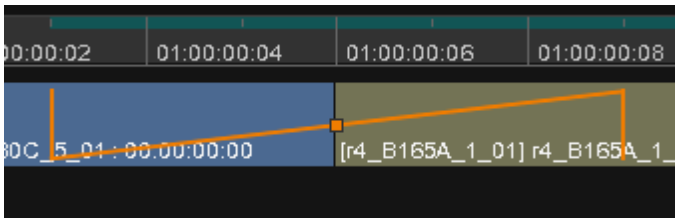


You can fix an invalid transition by going into *trim* mode and either :

- Trimming the shot that requires the extra handles for the transition. Once valid, the transition changes from red to white.
- Adjusting the transition itself

Selected Transition

A selected transition is displayed as orange.



If the transition is fully valid, i.e. there are sufficient *handles* in the tail of the first segment and head of the second segment to carry out the transition, then the line denoting the transition will be white, as in the image above. If there are insufficient *head* or *tail* overlap frames then the line be red, instead of white, over those frames which have insufficient underlying material.

To make the transition valid, you can either adjust the transition handles, i.e. the start/end frames of the transition, or you can trim the underlying segments to create the necessary handles. For either operation you need to switch to '***Trim Mode***', via the button on the shared toolbar, shown in the image above.

Once in trim mode, you can click on the transition handles and drag them with the mouse to increase or decrease the length/duration of the transition.

For trimming. refer to the Trim Modes section.

Editing the Effect on a Transition

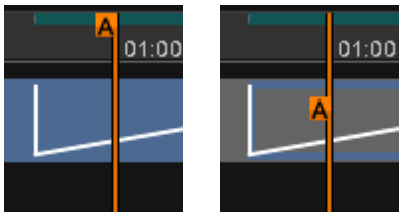
To edit the parameters of the transition effect you first need to make the transition the *active selection*.

To do this, place the active playhead in the first segment, positioning it over any of the frames the make up the transition. This will set the underlying segment as the *active segment*.

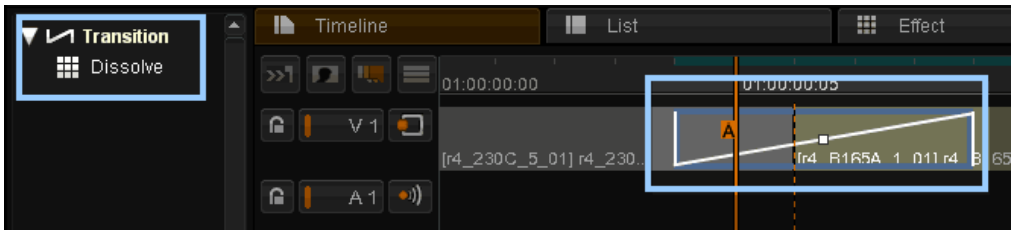
Then press the keyboard **Page Down** key to switch the active selection from the segment to the *transition*.

Note that the play head flag will change (drop down) to show that you are

editing the dissolve now :

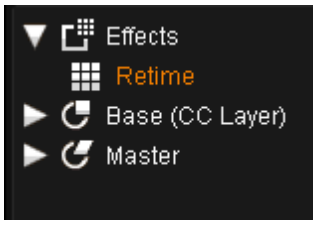


A blue box will now appear around the transition to show that it is the active selection, and the effects tree panel will change to display the transition effect:



To edit the parameters of the transition effect you simply have to double-click on the effect in the effects tree panel, as when editing any effect.

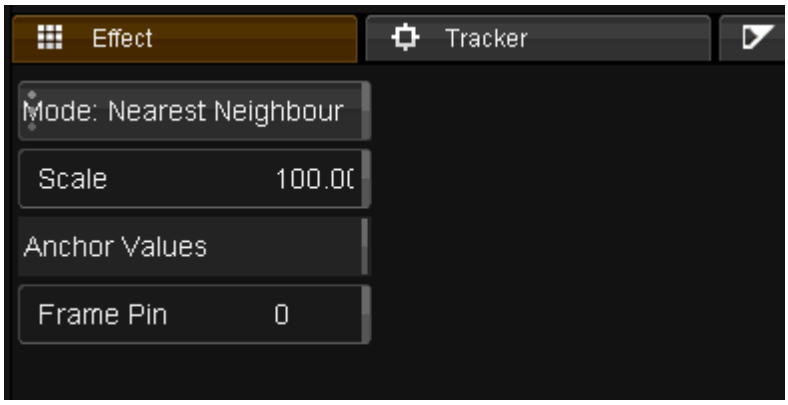
Retime



The retime effect allows you to change the duration of a shot, either adding or discarding frames as necessary. A retime effect, being time-based, is treated slightly differently to other effects.

A *retime* effect should added as a plain *Effect* node at the top of the tree.

Parameters



Mode

The retime Mode determines the accuracy of the retime calculation for the final output sequence. It can be set as :

- *Nearest Neighbour*
- *Bilinear Interpolate* - more accurate

Scale

The *Scale* determines a percentage retime speed.

Note that setting a scale to **zero** (0) lets you adjust a clip duration *manually* by stretching it using the cursor.

Frame Pin

The *Frame Pin* determines which frame in the source stays constant for the output sequence.

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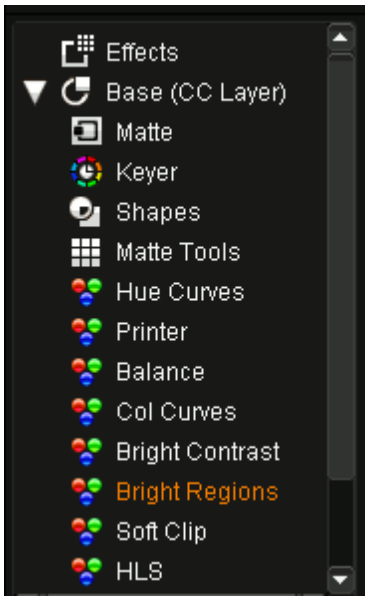
Brightness Regions

The Brightness Regions effect allows separate adjustness of the shadows, midtones and highlights.



It is available as a CC Layer, an Effect Layer or a User Effect.

From the Control Panel, the trackballs adjust black, mid and highlight Brightness Regions when the Color panel is set to Brightness Regions.

The thresholds for black, mid and white can be altered from the top menus by pressing B.M or W respectively. The RGB values for black, mid and white can also be adjusted from the top menus by pressing B.M or W a second time. These buttons are on the right of the top menu when Brightness Regions mode is selected.

If you need finer control over the areas affected, you can also use *luminance* keys.

Printer Lights

Printer Lights are named after the laboratory process of filtering light during the film printing process, to control the colour of the film.

The numeric values displayed in the GUI and on the panels can be calibrated in the *Preferences* pages, so that they match a local film lab. The number of *points per f-stop* can also be calibrated.

On the panel, the top menu knobs adjust red green and blue Printer Lights when the Color panel is set to Balance, Color Curves or Brightness Regions and the right hand menu selection is button 1, labeled All.

Printer Lights affect all pixels and produce a very clean correction. They are ideal for balancing raw images, log files or flat transfers. They are also a good way to remove color casts and adjust color temperature offsets.

Density

Density is *Printer Lights* ganged together and a density reset makes each of the RGB Printer Light values neutral. Density works the same as the *Brightness* tool in *Brightness/ Contrast* and is also known as offset in some other systems.

Although *Density* and *Brightness* behave the same, they are in fact different controls and occur at different stages of the processing path within a layer. They can be used independently of each other, although Brightness is used less frequently because it does not appear on the control panels. See *S Gamma* to learn more about Contrast.

This control affects all pixels equally, regardless of luminance, color or position. Its affect is similar to camera exposure and it is useful for adjusting the source image dynamic range to a pleasing level. Since it does not squeeze or stretch the dynamic range it causes no artifacts and is a great control to start grading raw or flat scanned images.

Some use Density to set black levels and others to use it to assign the mid range. Both methods are correct.

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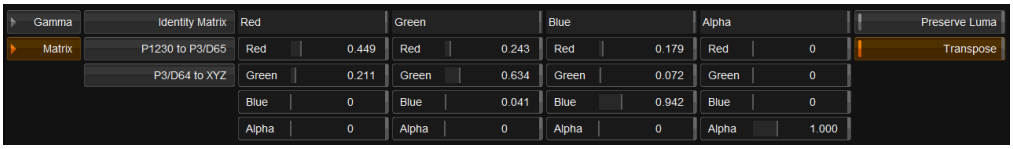
Use Density with a *dynamic* to grade a fade to black.

Gamma Matrix



The *Gamma Matrix* tool applies a *matrix colour transformation* to your image sequence. A *gamma* correction factor can also be set before and after this transformation is applied. You can define and apply *presets* for both the gamma correction and the colour matrix.

The *gamma function* applied here is based on a standard *power law* mathematical expression.

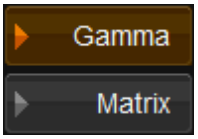
Compared to a *3D Lookup Table*, the *Gamma Matrix* tool allows for a more precise and efficient way to convert between various colour domains e.g. RGB to/from XYZ or RGB Rec709 to/from RGB DCI-P3 etc.

This tool is not designed to convert between *video* and *film* colour domains (e.g. film look or negative density).

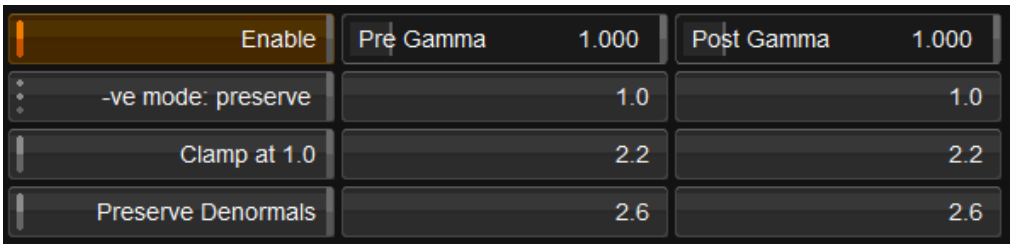
Enable

The *Enable* toggle button enables/disables application of the effect. Toggling this off will cause the effect to take no part in the processing chain.

Gamma



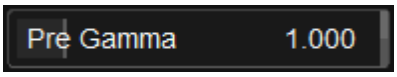
Switch to the *Gamma* settings using the *Gamma* button.



Pre/Post Gamma

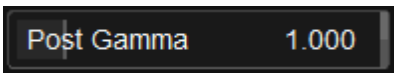
A gamma correction can be applied to the sequence **before** (*pre*) and/or **after** (*post*) any colour matrix is applied.

Pre Gamma



The *Pre Gamma* slider applies the specified gamma to the image before the colour matrix is applied.

Post Gamma



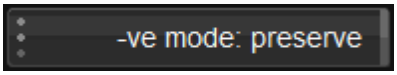
The *Post Gamma* slider applies the specified gamma to the image after the colour matrix is applied.

Pre/Post Gamma Presets

Below each gamma slider are *gamma preset* buttons. Press each button to quickly set the specific gamma.

See the Presets section for details on configuring and positioning preset buttons.

Negative Mode



The *Negative Mode* (-ve mode) button lets you choose how to process negative values.

preserve

The *preserve* setting leaves negative values as they are.

The processing chain is :

```
-val -> process -> result
```

clamp

The *clamp* setting clamps negative values to **zero** (0).

The processing chain is :

```
-val -> 0 -> process -> result
```

process

The *process* setting causes negative values to be processed as if **positive**.

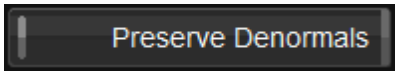
The processing chain is :

```
-val -> +val -> process -> -result
```

Clamp at 1.0

The *Clamp at 1.0* button causes values greater than 1.0 to be *clamped* to 1.0.

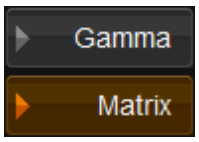
Preserve Denormals



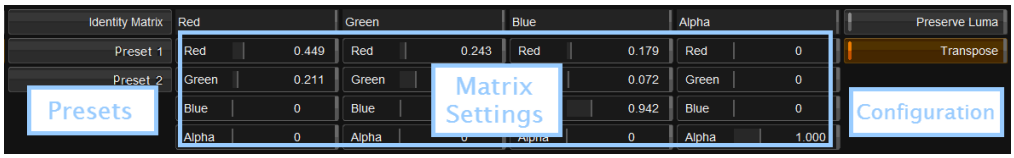
The *Preserve Denormals* button enables the use of very small floating point numbers in the processing chain.

This setting is not needed for most reasonable gamma values. When enabled, the *Gamma Matrix* tool will take longer to process the sequence.

Matrix



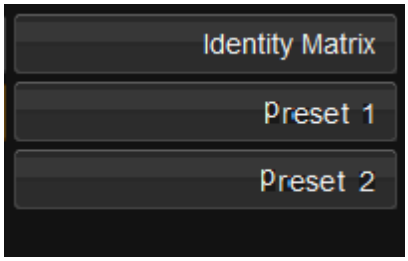
Switch to the *Matrix* settings using the *Matrix* button.



The *Matrix* page consists of three sections :

- *Presets* on the left
- Matrix *settings*
- Matrix *configuration* on the right

Matrix Presets



Any matrix presets you have defined will be listed in the first column. Pressing any preset button will load the preset values into the matrix.

See the Presets section for details on configuring and positioning preset buttons.

Matrix Settings

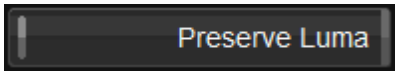
The *Red*, *Green*, *Blue* and *Alpha* matrix component values are listed in the central section. You can enter these values *manually* using the value sliders, or activate a *preset* button to load predefined values.

Pressing a preset button (e.g. *Identity Matrix*) will set the matrix values to the preset values.

Matrix Configuration

The *Matrix Configuration* column contains utility functions that modify the way the colour matrix is interpreted.

Preserve Luma



Setting *Preserve Luma* will adjust the resultant matrix such that the *scale* of

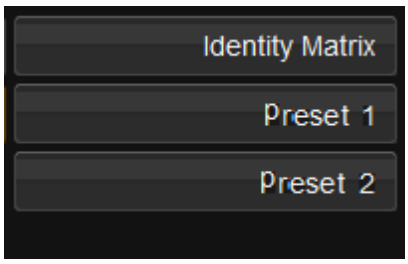
each component value stays the same relative to the others, thus keeping the output luminance the same.

Transpose

Setting *Transpose* causes the matrix to be *transposed* before being processed.

> Note that the matrix settings will not change when *Transpose* is enabled. However, it is transposed *internally* before use.

Presets



You can define **presets** for both the gamma settings (pre and post) and the colour matrix settings. These can be made available inside the *Gamma Matrix* tool as preset buttons.

To create and use a preset, you need to do two things :

1. Define the preset and the values it sets.
2. Lay out the preset button in the tool interface.

These operations require the modification of two text files in the application *root* folder.

Preset Definition

Location :	`C:\Nucoda\2014_1\root\ParamPresets.prefs`

File Format

All presets are defined in the `ParamPresets.prefs text file,` wrapped inside the `ParamPresets` tag. The *Gamma Matrix* effect is defined in a section wrapped with the tag `GammaMatrix`.

Within the `GammaMatrix` section, define one or more preset sections as shown below.

```
ParamPresets
{
  ...
  GammaMatrix
  {
    PresetID1
    {
      ...
    }
    PresetID2
    {
      ...
    }
    ...
  }
}
```

Each preset has a **unique identifier**, shown above as `PresetID1`, `PresetID2` etc.

These *unique* names are used to reference the preset when placing it as a button in the tool interface (see the Preset Layout section).

By convention, these preset identifiers are named in a style that identifies their usage i.e.

- `preGamma16`
- `postGamma20`
- `matrixIdentity`
- `matrixRGBtoXYZ`
- `etc.`

Pre/Post Gamma Presets

Set pre-gamma and post-gamma using the `preGamma` and `postGamma` declarations within a section :

```
preGammaID1
{
  preGamma <FLOAT>
}

postGammaID2
{
  postGamma <FLOAT>
}
```

Where `<FLOAT>` defines a floating point value for the gamma applied e.g.

```
preGamma188
{
  preGamma 1.88
}
```

The above pre-gamma section would be *referenced* inside the *Layout* file through the identifier "preGamma188".

Matrix Presets

A *matrix* preset specifies each *red*, *green*, *blue* and *alpha* column value as follows :

```
matrixID
{
  red
  {
    red <FLOAT>
    green <FLOAT>
    blue <FLOAT>
    alpha <FLOAT>
  }
  green
  {
    red <FLOAT>
    green <FLOAT>
    blue <FLOAT>
    alpha <FLOAT>
  }
  blue
  {
    red <FLOAT>
    green <FLOAT>
    blue <FLOAT>
    alpha <FLOAT>
  }
  alpha
  {
    red <FLOAT>
    green <FLOAT>
    blue <FLOAT>
    alpha <FLOAT>
  }
  transpose <BOOLEAN>
}
```

Where `<FLOAT>` defines a floating point value e.g.

```
matrixTestSample
{
  red
  {
    red 0.782000
    green 0.366000
    blue 0.455000
    alpha 0.000000
  }
  ...
  ... etc.
  ...
  transpose true
}
```

`transpose` is a `<BOOLEAN>` and can be set to *true* or *false*. If not present, *transpose* is assumed **true**.

The above matrix would be *referenced* inside the *Layout* file through the identifier "matrixTestSample".

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Preset Layout

Location :	C:\Nucoda\2014_1\root\ParamLayout.configs

The ParamLayout.configs file arranges various tool interface **elements** - *parameters*, *pages*, *buttons* etc.

File Format

All layouts are wrapped inside the `paramConfigurations` tag. The *Gamma Matrix* effect layout is defined in a section wrapped with the tag `GammaMatrix`.

> Note that each tool (e.g. *GammaMatrix*, *HLS*, *DvoRegrain* etc.) has parameters delimited by **square brackets** ([,]).

Within the `GammaMatrix` layout section, specify preset buttons use the syntax :

```
presetButton "<BUTTON NAME>" "<IDENTIFIER>"
```

Where `<BUTTON NAME>` will be the button *title* (text on button) and `<IDENTIFIER>` identifies the button action to use from the preset definition file.

For the *GammaMatrix* tool, the `<IDENTIFIER>` key has a format :

```
GammaMatrix.<PresetIdentifier>
```

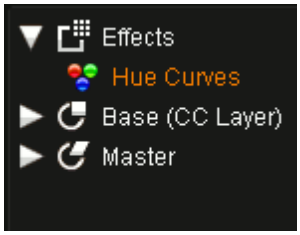
The `<PresetIdentifier>` is the *unique* name given to the preset (see the Preset Definition section).

Examples

```
paramConfigurations
{
  ...
  ...
  GammaMatrix
   [
     ...
     presetButton "Test Matrix" "GammaMatrix.matrixTestSample"
     presetButton "1.88" "GammaMatrix.preGamma188"
     ...
   ]
   ...
}
```

The above produce the following interface buttons :

Hue Curves



Hue Curves is a powerful effect that allows you to modify the hue, lightness or saturation (HLS) of a shot using an interactive graph.

Parameters

Hue / Lightness / Saturation

The Hue, Lightness and Saturation toggle buttons on the left of the graph select how the graph affects the image.

Hist

The *Hist* button shows or hides the *histogram* display in the graph window.

You can select (pick) areas of colour from the image using your mouse, and these areas will be displayed on the graph as an aid to graph manpulation.

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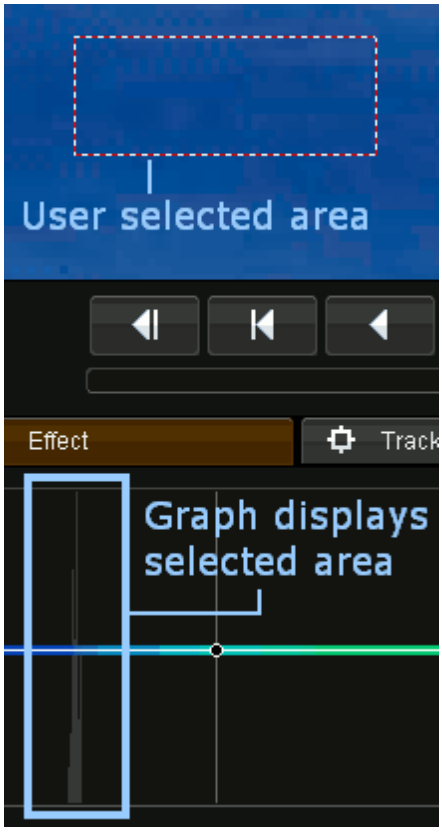


Add Point / Delete Point

You can Add or Delete points from the graph by toggling these buttons on, and then clicking on the graph. This allows finer manipulation of the area of the image affected by the effect.

Scale

The Scale slider adjusts the scale of the graph shown.

Discussion

Hue Curves is the only tool that utilizes the top menu of both the *Color* and the *Image* panels.

The top buttons on the Image panel select one of six preset points on a spectrum. These presets assign the menu controls of the Color panel to red, yellow, green, cyan, blue, or magenta. When the Color panel is set to **[Menu 2]**, labeled ***Positive***, the knobs adjust hue, luminance and saturation of the selected color. This tool can isolate and adjust several colors in the same layer.

If Color panel **[Menu 3]**, labeled ***Inverse***, is active the selected color is left unchanged and the other 5 points are adjusted.

[Menu 3] *Inverse* makes it very easy to create black and white images with

one color retained.Color panel **[Menu 1]**, labeled ***All***, selects all six points and configures the Hue Curves to work the same as the HLS tool. This might seem redundant but the default processing path puts Hue Curves first in a layer and HLS as last. ***Hue Curves All*** is useful for creating duotone and split tone effects in one layer, whilst HLS modifies the layer correction as well as the natural color.

Soft Clip

The *Soft Clip* effect allows full control over black and white point clipping, and threshold values. Each RGB channel can be independently controlled.

Parameters

The *Soft Clip* effect has separate *white* and *black* modes, chosen via the toggle buttons to the left.

- The *white* mode includes *Threshold White* settings.
- The *black* mode includes *Threshold Black* settings.

Clip

This setting controls the level of clipping done per RGB channel.

Softness

This setting controls the fall-off (*softness*) in the clipping performed.

Threshold White / Threshold Black

These settings control the *cut-off* values for white/black clipping.

Discussion

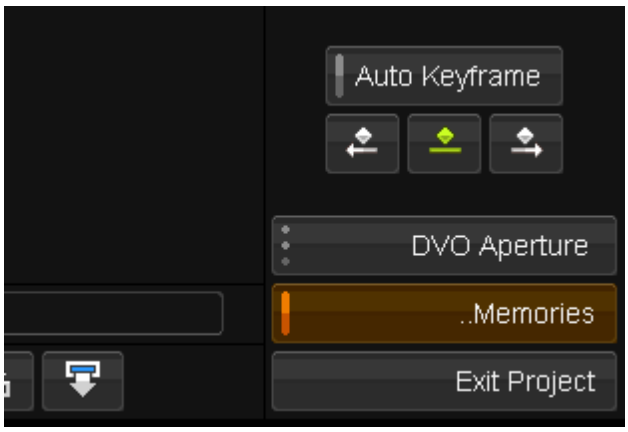
On the control panel, the black and white trackballs adjust soft clips when the Color panel is set to *Clip*. The outer rings adjust a neutral clip and the balls clip the RGB channels separately to cause colour in the peak whites or blacks.

The clips are useful for removing colors introduced by clip settings in a telecine or camera as well as creating color offsets in the highlights and shadows.

Effect Notes

You can store all, or a chosen subset, of the effects on a segment (including any keyframes) using effect *Notes*.

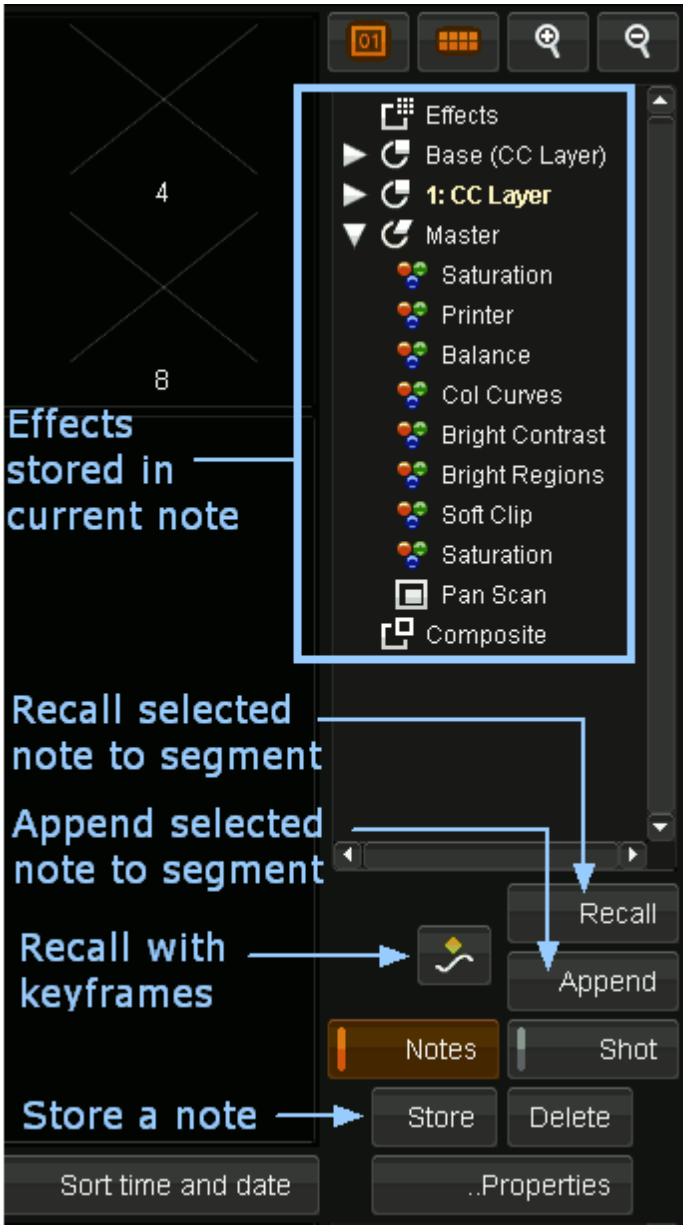
This is available via the *..Memories* button (at the bottom right of main screen).



Storing and Recalling a Note

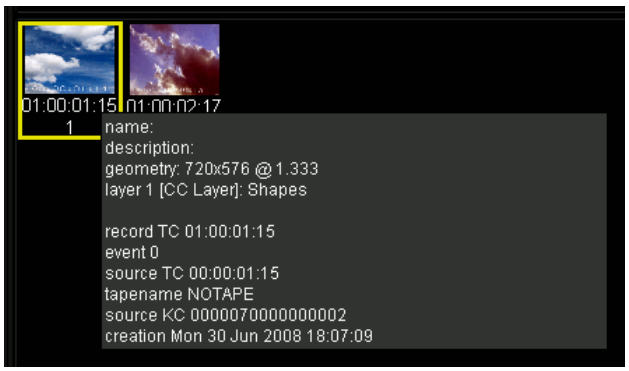
In *Memories/Notes* view, store a note for the current shot by pressing the Store button.

To recall a note, press the Recall button. The effects contained within the note will be applied to the current shot.



Notes are placed in the the notes library and display a thumbnail.

Hovering your mouse cursor over a note will display the note contents :



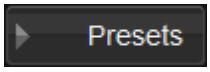
Selecting a note will display the note effects in the note effect tree (top-right).

Lens Distort

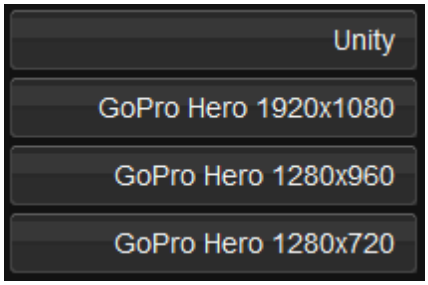
The *Lens Distort* tool can fix and undo camera lens distortion.

A number of presets are included for various *GoPro* cameras.

Presets



Presets are predefined settings organised as easy to apply button actions. A preset exists for some commonly used *GoPro* camera formats e.g. *GoPro Hero at 1280x960* etc.



Each preset will set up the *Distort* parameters described below.

Unity

This removes all correction and disables *Lens Distort*.

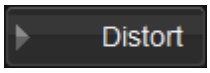
The *Distort* parameter is changed from *Remove Distortion* to *Off*.

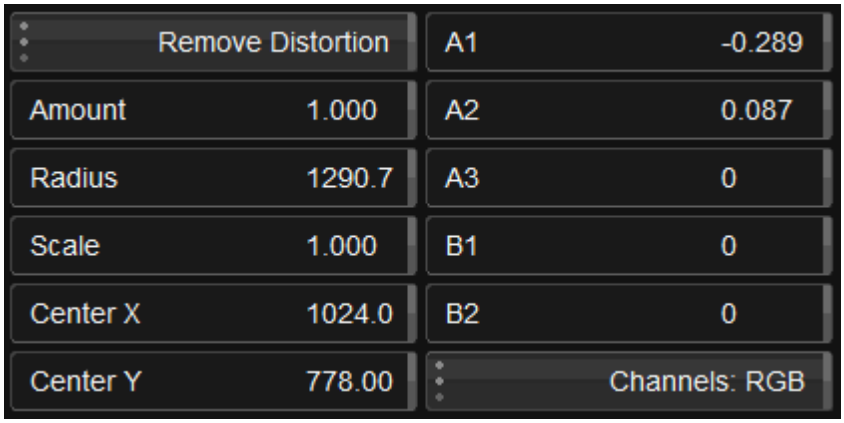
GoPro Hero 1920x1080

This preset is the tool *default*.

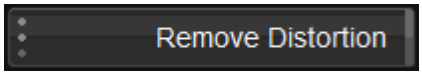
This means that when we **reset** the tool, it resets to the default value as per the *GoPro Hero 1920x1080* preset.

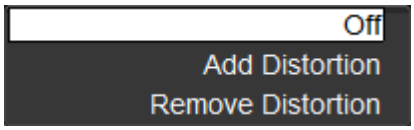
Distort Parameters





Application





Choose to *disable* tool, *add* or *remove* distortion. The default is *Remove Distortion*.

The *Off* setting (tool disabled) is equivalent to the *Unity* preset.

Amount

The amount of correction to apply (*strength*).

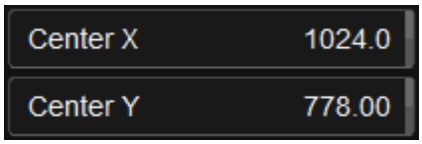
Radius

The Radius determines the *distance* before we see distortion.

Scale

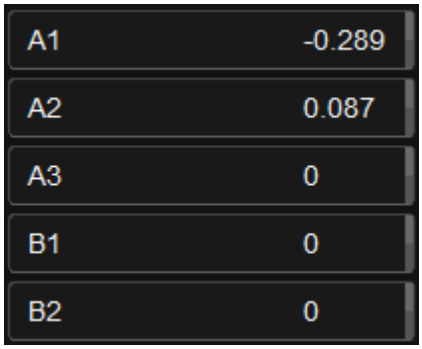
This scales the source image from its center.

Center X/ Center Y



The center point of the distortion. Default to image center point.

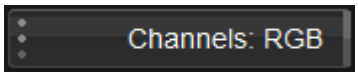
A1 A2 A3 / B1 B2



These define the lens distortion *coefficents*.

A1 deals with the major "fish-eye" style distortion while A2 and A3 are more distant, edge distortion. B1 and B2 deal with distortion considered as pans in Z space (or up and down).

Channels



Values : RGB , R , G , B
Default : RGB

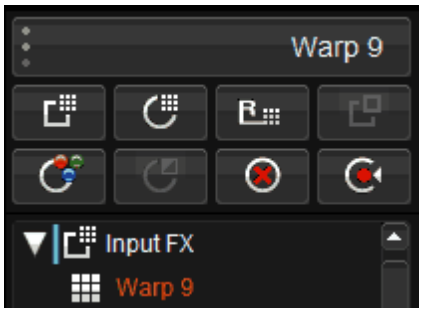
Correct distortion in a *single* RGB channel or (by default) all three.

17

Warper

2014.1

Warper 17



Warp 4 and *Warp 9* are sophisticated image warping tools. They can be used to fix geometric issues and distortion within image sequences.

Both have a broad application but are of particular use when working with *Stereoscopic* 3D sequences.

The two *Warp* tools are :

Warp 4 The *Warp 4* warper is a classic *four* point warper and allows warping through the manipulation of the four image corner points.

Warp 9 The *Warp 9* warper extends the *Warp 4* warper with extra control points on each side mid-point and the center point.

Both warpers allow warping of all three RGB channels simultaneously, or each channel separately.

Warper Introduction

Both warper tools are designed to be useful in a wide variety of situations.

The *Warp 9* tool should be particularly useful in two important areas described below. Both areas of specifically relevant to *stereoscopic* work.

For most *Stereoscopic* work, you would use a warp tool directly after the DVO Stereo Fix tool.

Geometric Correction

The *Warp 9* tool makes *geometric correction* straightforward. This issue arises due to distortion between the camera lenses or the mirror from the stereo rig and creates a non-uniform vertical mismatch between the left and right eye images.

By correcting to the center of the image, *Warp 9* can then adjust each

quadrant of the image, adjusting the points in Y whilst leaving the center point unchanged. This provides a much more accurate geometric match as a result.

Frame Violation

The *Warp 9* warper makes it very easy to bend the image *forward* or *backwards* in depth. This is done by moving the control points in X only. By moving selected areas you can minimise *frame violation* (where objects are too far forward in space), thus limiting the effect on the rest of the image.

Warper Basics

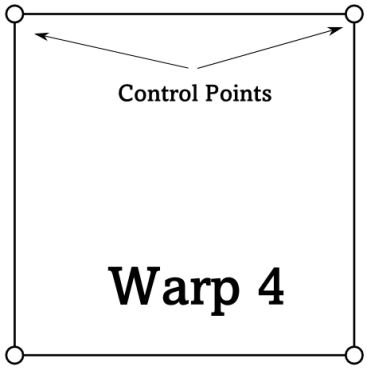
Both *Warp 4* and *Warp 9* warpers share common features.

A warp is created by selecting and moving one or more control points. These can be manipulated and controlled interactively using the *mouse* or the *GUI controls*.

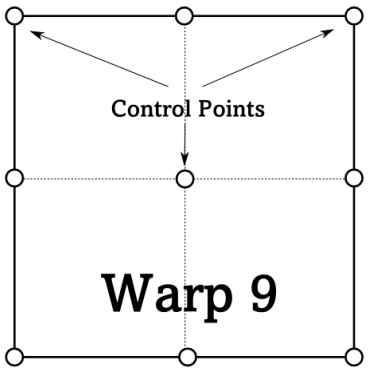
Owners of a *Precision Panel* can also use it to control the warper tools.

Control Points

Control points are placed around the edges of the *source* image.



Warp 4 : *four* warper control points.

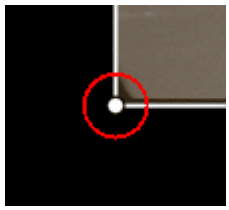


Warp 9 : nine warper control points, including the *central* control point.

Control points change their look when used :

An unselected control point.

A selected control point


A control point with a mouse cursor proximity indication.

Mouse Control

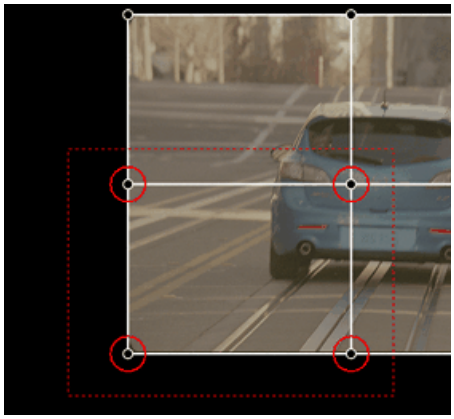
A control point is indicated in red when your mouse cursor is within range.

To select points :

- **Select one control point :**
  Click it with the left mouse button
- **Select multiple control points :**
  Hold down the *SHIFT* key while click selecting points with the left mouse button
- Hold down left mouse button and *drag* to warp image

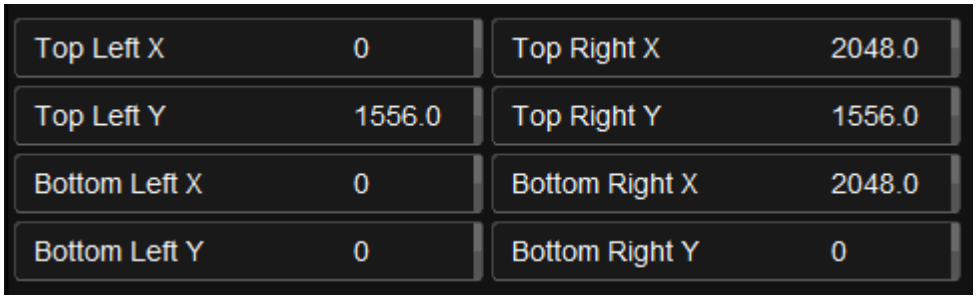
Marquee Select

You can *marquee select* multiple control points by drag selecting them :


Drag select multiple points using the mouse.

GUI Controls

Once selected, you can manipulate control points via the GUI controls, using the mouse or keyboard to enter value.



The Warp 4 GUI controls

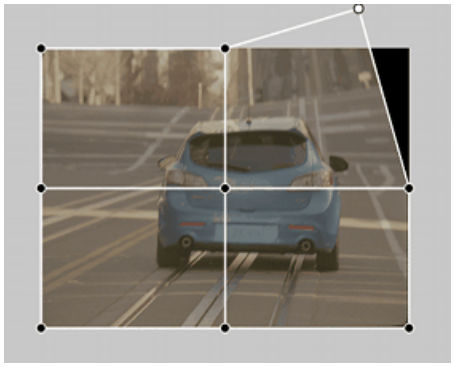
The *Warp 4* GUI controls are shown above, and include separate sliders for the X/Y movement of each Warp 4 control point. Four points leading to eight sliders.

The *Warp 9* GUI controls are similar but have eighteen sliders corresponding to X/Y for all nine control points.

Warp 9-as-4

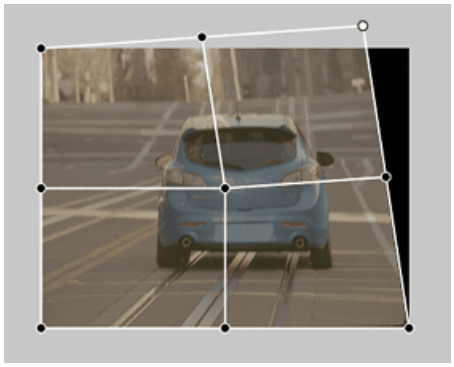
You can make the Warp 9 tool warp in a similar mode to Warp 4 by selecting a corner point and dragging whilst holding down the ALT key :

Mouse drag top-right point :



Normal Warp 9 single point drag and warp behaviour.

\+ ALT :



Warp 9 warp behaviour with ALT held down.

Note that the warper behaves in a similar way to Warp 4 and as if the mid-points do not exist. The central point stays locked in place however.

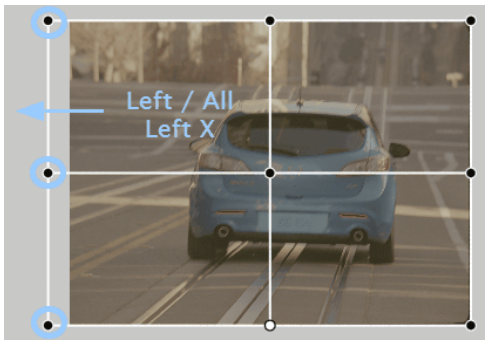
The *Precision Panel* has a *4 Points* toggle to enable this mode. In effect, the Warp 9 tool changes to a Warp 4 :

Frame Violation

For frame violation issues, the Precision Panel has mode that lets you modify all left points in X, all right points in X, all top points in X etc.

- Use the *Left*, *Top*, *Right*, *Bottom* buttons to select the row of affected control points
- Then move all the selected points in the X or Y axes using the *All Left X* or *All Left Y*, or *All Top X*, *All Top Y* etc.

Using *Left / All Left X* to select and move only one side of the image in the X axis.



Basic Controls

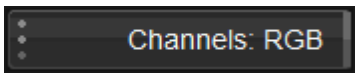
Scale

Values : 0 - >100000 (slider)
Default : 1.000

The Scale slider lets you scale the image from image center.

You may want to hide warper boundary artifacts in some circumstances and the *Scale* control can push these outside the visible frame.

Channels

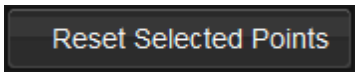


Values : RGB , R , G , B
Default : RGB

You can choose to warp only a single RGB channel or (by default) all three.

This can be useful for cases (e.g. *stereoscopic* sequences) that have distortion that differs in one or more colour channels.

Reset Selected Points

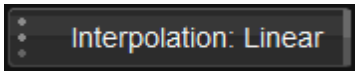


This button will reset any *selected* control points.

This also removes any *keyframes* associated with the control points.

Warp 9 Extended Controls

Interpolation



Values : Linear , Bicubic
Default : Linear

Linear interpolation is faster but less accurate than *Bicubic*.

Center Pinning

Pinning the central control point stops it moving when manipulating other control points and so protects the central part of the image.

Use the *Pin Radius* to hold a proportion of the central image area steady as you move other control points around.

DVO Effects

DVO Effects 18

DVO stands for *Digital Vision Optics*, a collection of image processing tools running in software on generic computer platforms. DVO effects are optimised to make use of the latest multithreading, CPU and GPU computer technology.

With the DVO toolset, Digital Vision brings twenty years of experience in developing high performance image processing algorithms to the world of data-centric restoration, digital intermediate and commercial work.

Many DVO effects are available and will be described in this chapter.

DVO tools are **shot based** and require the presence of *scene information*. Always *scene detect* pre-conformed media or *adjustment tracks* that span more than one shot.

Introduction

Many DVO tools are available and each can be applied *independently* to *individual* timeline segments. A timeline segment can have multiple different effects applied, stacked in various configurations (layers).

Selecting a DVO Effect

The individual DVO tools are logically grouped into *packages* :

- *DVO Restore* - repair and renovate media
- *DVO Enhance* - improve detail and add clarity
- *DVO Video* - tools to process and fix video content
- *DVO Convert* - standards conversion, upscaling and de-interlacing
- *DVO Camera* - tools to process digital camera related content

Each package contains a set of DVO tools available. Choose via the *Effect Toolbox* to the left of the timeline :

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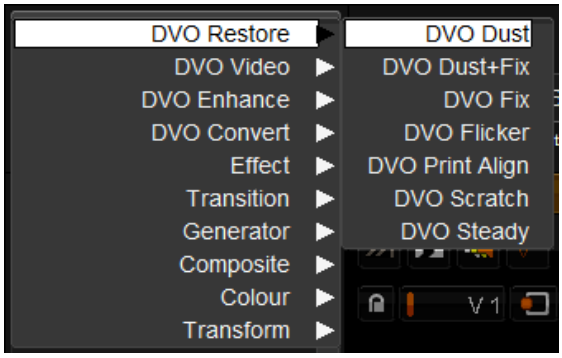
The selector displays the groups and effects as a *drop-down* list :



Applying a DVO Effect

Once you select the DVO effect, you can add it to the *active* timeline section as :

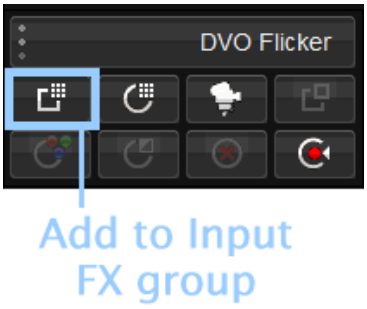
- Part of the *Input FX group* or
- A new *FX Layer*

Adding the DVO effect inserts the selected DVO tool at the appropriate place in the *Effects Tree* to the left of the timeline.

Input FX

Press the *Input Fx* button to add the selected effect to the *Input FX* group :

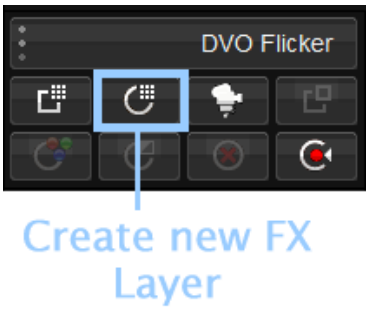
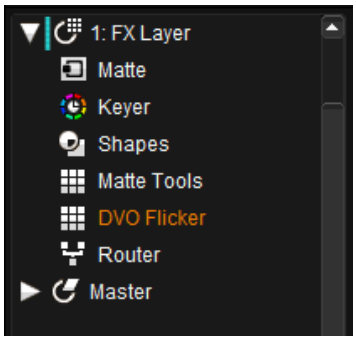
In the example below, the selected effect (here DVO Flicker) is added at the top of the effects stack in the Input FX group.

Action :	Effects Tree Result :
	

FX Layer

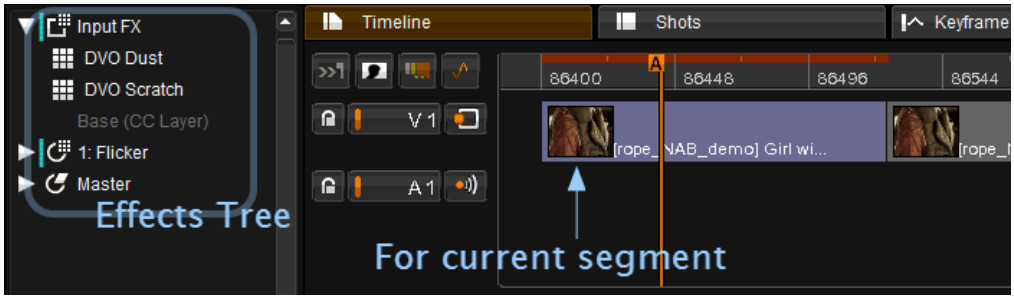
Press the *FX Layer* button to add the selected effect to the *FX Layer* group :

In the example below, the selected effect (here DVO Flicker) is added to the FX Layer group. An FX Layer gives you extra layer tools such as a Keyer and Shapes.

Action :	Effects Tree Result :
	

In *Phoenix Finish* and *Phoenix Video*, only the basic colour correction layer (*Master Layer*) will appear in the *Effects Tree* by default.

The *Effects Tree* will display **all** effects applied to the *current* timeline segment (segment under play-head). The tree will dynamically update if the current segment changes (such as during play-back).



Additionally, a segment with effects applied is displayed in a different colour to a segment with no effects applied. See the Compositions section.

DVO Stereo Fix

DVO Stereo Fix is an advanced stereo enhancement tool designed to resolve colour matching and geometry alignment issues with stereo sequences. The tool can address problem areas when they appear over the entire image frame (global correction) or in different areas inside a frame (local correction).

The tool will be able to correct most problems automatically but where this is not possible, controls are available that allow straightforward manual correction.

Enabling Stereo Work

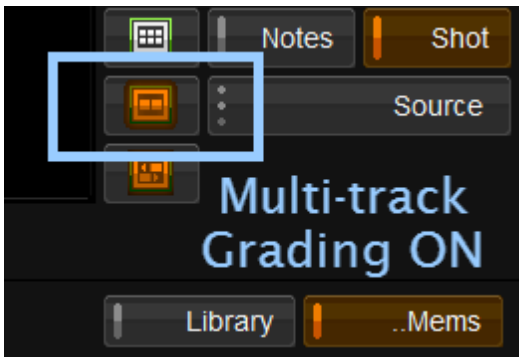
Some basic setup is required to use the *DVO Stereo Fix* tool.

Project

Your **project** should be enabled for *Stereoscopic Output* :

Composition

You should have *Multi-track Grading* enabled inside the project :



A clip with Multi-track *enabled* will display edge markers as shown below :

Adding the Tool

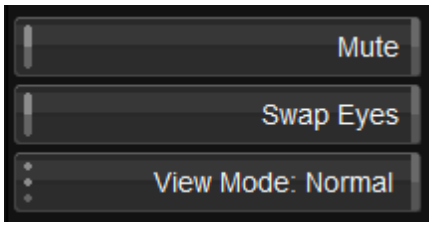
DVO Stereo Fix must be added as an *Input FX* tool :

Overview

The tool has the following basic control layout, with the two primary tool areas being :

- Colour matching controls
- Alignment (geometry) controls

View Controls



Mute

Mutes both the *colour match* and the *align match*, as well as any associated *border/blanking modes*.

The parameters in this section regarding view and orientation remain active i. e. SwapEyes/ViewMode/Mirror/Flip.

This can be used to compare before and after while correcting any necessary mirror/flip.

Swap Eyes

Swaps left and right eye on output.

All parameters referring to either left or right are associated with the *source* left and right tracks. As such, the actual *processing* is not affected by swapping eyes on the output.

View Mode

Values : Normal , Blended , Side-By-Side
Default : Normal

This control allows different view modes to be applied on the output and is used mainly for visualisation purposes.

Normal	Separate left and right outputs.
Blended	Blends left and right image, which could be used to verify alignment processing.
Side-By-Side	Displays left and right images side-by-side with halved horizontal resolution. If this mode is used to verify colour matching simultaneously, please note that many monitors might have colour reproduction which varies spatially or by viewing angle.

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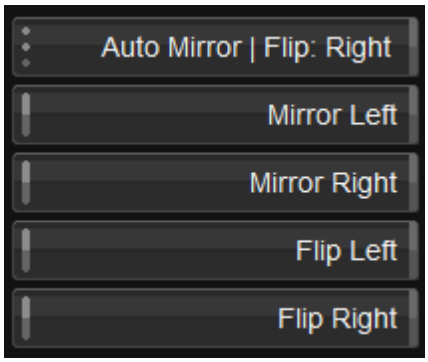
Mirror Controls



The Mirror Controls will automatically determine and correct for a mirrored left or right eye. If required, manual correction can also be set here.

Auto Mirror

Values : Disable , Left , Right
Default : Right

Automatically determines mirror and flip between left and right eye. If we detect a requirement to mirror or flip, it is applied to the specified eye.

> This automatic correction will follow any manual mirror or flip settings applied to the other eye.

Mirror Left

Manually set left eye to be mirrored.

Mirror Right

Manually set right eye to be mirrored.

Flip Left

Manually set left eye to be flipped (*vertically*).

Flip Right

Manually set right eye to be flipped (*vertically*).

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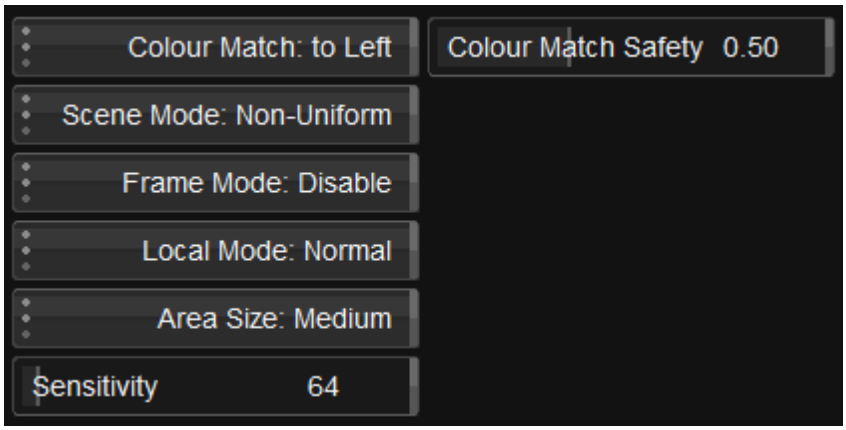
Colour Matching



These controls allow us to correct the colour match between the left and right eyes.

Colour Match

Values : to Left , to Right
Default : to Left

Sets colour processing to match the *specified* eye.

Setting this to "to Left" will process the *right* eye to match the *left*.

Scene Mode

Values : Disable , Uniform , Non-Uniform
Default : Non-Uniform

Sets the colour matching mode for a scene such that the scene is analysed and processed equally throughout (all frames). The different modes relate to how colour matching may vary *spatially* over the image.

This is unrelated to any *spectrum transformation* being uniform or non-uniform.

Disable	No colour match processing is performed (on scene basis).
Uniform	Colour matching is assumed to be *spatially uniform*.
Non-Uniform	Colour matching is allowed to be *spatially non-uniform*. This mode typically works just as well when the colour differences are spatially uniform.

Scene Mode requires proper *scene edits* as normally one scene will behave very differently to another.

Frame Mode

Values : Disable , Uniform , Non-Uniform
Default : Disable

Sets the colour matching mode which is applied per frame *individually*.

The processing and modes are the same as described above for *Scene Mode*.

This option can be used as an alternative to *Scene Mode* processing if it appears that colour differences change on a *frame by frame* basis. It is recommended that *Scene Mode* processing be **Disabled** when used.

Local Mode

Values : Disable , Normal
Default : Normal

This option allows for more *localised* colour match processing than found in *Scene* or *Frame Modes*. The *Area Size* and *Sensitivity* controls are linked to Local Mode processing.

Area Size

Values : X-Small , Small , Medium , Large , X-Large
Default : Medium

The smaller the Area Size is the more locally aggressive it can be considered to be.

Sensitivity

Values : 0 - 1023
Default : 64

The *Sensitivity* parameter is used to control the allowed difference ranges. The values we set correspond to 10 bit levels. The effect of Sensitivity is as a safety measure rather than a processing amount.

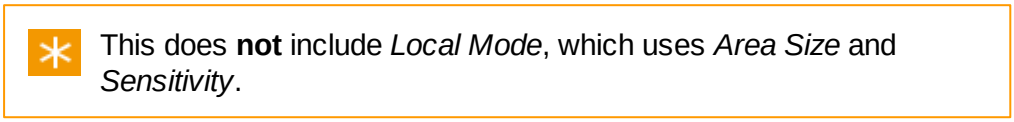
To speed up the processing of *complete* scenes/material, *Local Mode* processing can be disabled.

Colour Match Safety

Values : 0.0 - 1.0
Default : 0.5

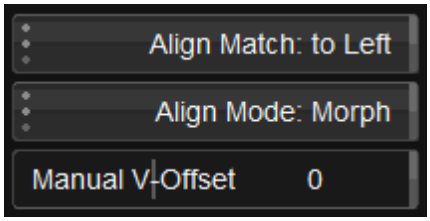
This parameter sets a general safety level for the *Scene* and *Frame Mode* colour matching.

Colour Match Safety applies to **black levels** as well as the analysis and variability of the *spectrum transform* applied.



This does **not** include *Local Mode*, which uses *Area Size* and *Sensitivity*.

Alignment

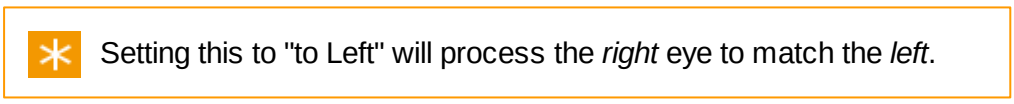


These controls allow us to correct the alignment (or *geometry*) between the left and right eyes.

Align Match

Values : to Left , to Right
Default : to Left

Sets alignment processing to match the *specified* eye.



Setting this to "to Left" will process the *right* eye to match the *left*.

Align Mode

Values : Disable , Manual , Global , Morph
Default : Morph

The alignment processing is based on *scene analysis* and frames are processed equally throughout the scene. The alignment can also be set manually or adjusted with a *global* offset (*Manual V-Offset*).

Disable	No alignment processing.
Manual	Set manual global vertical offset (using *Manual V-Offset*).
Global	Automatic and global adjustment.

Morph	Spatially variable adjustment with linear variability over the image.

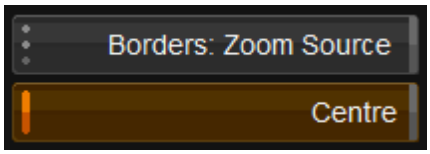
Like *Scene Mode* colour matching, *Align Mode* requires proper *scene edits* as normally one scene will behave very differently to another.

Manual V-Offset

Values : 0 - 128
Default : 0

Manual adjustment of the alignment.

Borders



The *Borders* controls let us correct any effect alignment has on frame borders.

Border correction also depends on the *Blanking* configuration (see below).

Borders

Values : Disable , Blank , Zoom Source , Zoom Fill
Default : Zoom Source

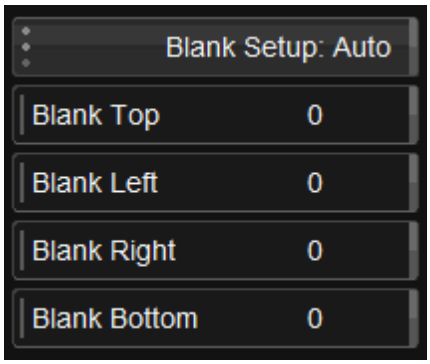
Disable	Disable border processing.
Blank	Automatically applies necessary blanking to borders.
Zoom Source	Automatically zooms the output to the source frame and original blanking. As per the *Blanking Mode*, this mode takes into account what needs to be excluded regarding the borders and alignment.
Zoom Fill	Automatically zooms the output to fill the full frame disregarding any original blanking of the source.

Centre

Values : On , Off
Default : On

Centre the result in the frame. This may be necessary for some *Border* modes.

Blanking



Blanking is closely linked to the *Borders* control and allows us to control how the frame borders are blanked.

Blank Setup

Values : Auto , Source , Output
Default : Auto

Blank Setup lets us choose if blanking is setup by *automatic* analysis or manually in relation to the *source* or the *output*.

Blanking affects the border processing and and its effect will depend on the *Borders* mode.

Auto	Use automatic analysis to define the blanking amount.
Source	Allow manual blanking setup.
Output	Manually specify blanking completely based on the output alone. This requires you to regard frame effects from the alignment processing manually, as well as the original source frame blanking. **This is an Advanced Mode.**

Blank Top / Left / Right / Bottom

Manual blanking adjustment to the top, left, right and bottom of the frame. Specified in *pixels*.

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DVO Dust

DVO Dust is a fully automatic and highly accurate film dirt, dust and random scratch concealment and video drop-out removal system. It can remove around 90% of visible imperfections without introducing unwelcome artifacts.

DVO Dust utilises a pioneering set of processing algorithms and new filters with the Digital Vision Emmy award-winning PHAME motion compensation technology. With manual "dust busting" being very time consuming and expensive, the automation in *DVO Dust* can typically reduce the amount of operator time required by an order of magnitude. This saves enormous amounts of time and money without any compromise in terms of picture quality.

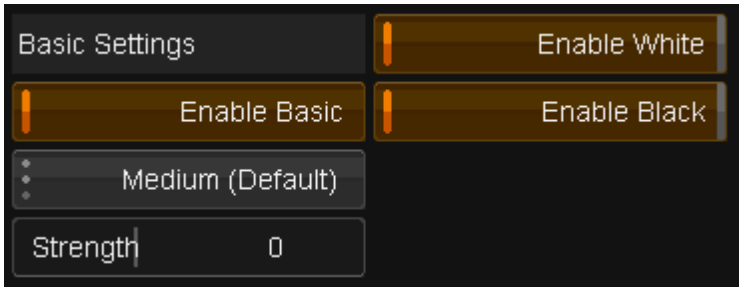
This effect has three groups of parameters:

The ***Enable*** toggle button allows the complete effect to be turned on or off.

- Presets - preset selections for quick dirt removal
- Processing - specific processing options
- Setup - additional settings for various processing selections

Basic Settings and Presets

The *DVO Dust* effect provides a number of *presets*, ranging from *Extra Light* to *Extra Heavy* removal. These work as a very good starting point before moving on to the more advanced controls in the *Processing* and *Setup* tabs. You may not need to use any of the advanced parameters.

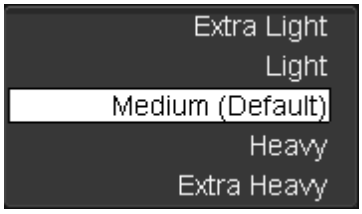


Enable Basic

The ***Enable Basic*** toggle button allows you to enable/disable *basic* mode. This mode uses presets to automate and hide much of the effect complexity.

> When you edit any of the settings in the processing or setup tabs the basic mode becomes automatically *disabled*. Similarly, when you select a mode from the basic modes, all settings will be automatically adjusted to fit the selected mode and basic mode will be automatically enabled.

Presets



This is a collection of preset settings (e.g. Extra Light, Heavy etc.) that setup the effect for a predefined level of dust/dirt.

Values : Extra Light, Light, Medium, Heavy, Extra Heavy
Default : Medium

Strength

This slider allows the adjustment of the strength of dust reduction processing to use. It is only available in *basic mode*.

Range : -5 to +5
Default : 0

Enable White / Enable Black

White/black dirt removal is enabled via the corresponding *Enable White/ Enable Black* toggle buttons.

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- *Enable Black* - for black/dark spots
- *Enable White* - for white/light spots

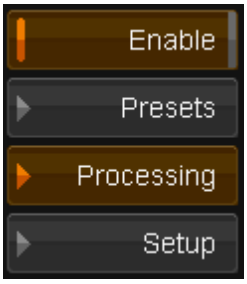
Both can also be enabled at the same time.

Default : On

These options also appear in the *Processing* tab and they are linked (changing one location affects the other).

> Note that if **neither** button is enabled then *DVO Dust* will **not filter at all!**

Processing Filters



The filters used by the process are very important in determining the final processed quality. *DVO Dust* includes a variety of filter algorithms that can effectively process a wide range of input footage.

Drop-down *Filter* list

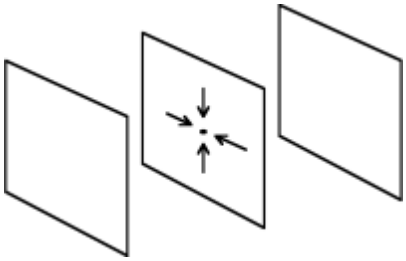
Spatial / Temporal / Mixed Filters

Values : Spatial, Mixed 1, Mixed 2, Mixed 3, Mixed 4, Temporal 1, Temporal 2, Copy Prev, Copy Next, Bypass

Default : Mixed 3

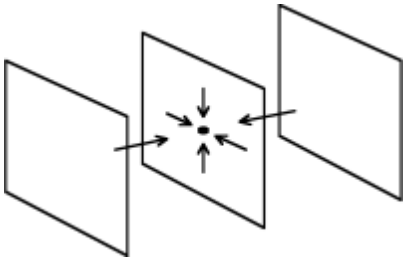
The following generic filter groups are defined.

Spatial



All filters named Spatial are filters that work only within the current frame (or field if the material is interlaced), i.e. it has taps only in the current frame. These filters are intended for very small spots.

Mixed



All filters named *Mixed* have taps in both the current frame and the frame previous to and following the current frame. That is, it has both spatial and temporal taps. All these filters however have more taps in the current frame than in the previous and following frames together (more spatial taps than temporal). These filters are intended for normal spots.

The different *Mixed* types (Mixed 1,2,3 etc.) change the ratio between spatial and temporal. The **larger** the number, the more *temporal* filtering.

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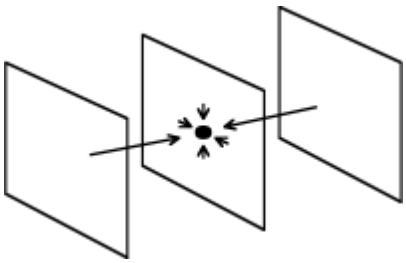
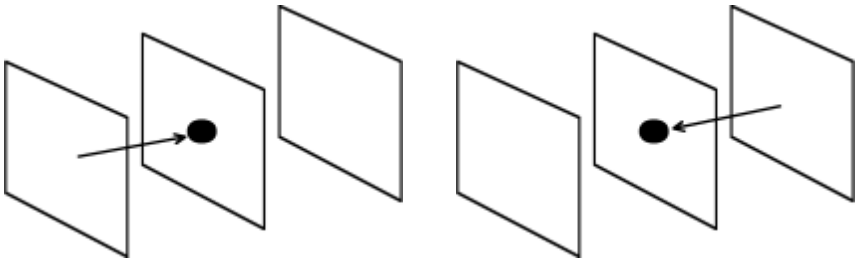
Temporal



Filters named *Temporal* have both spatial and temporal taps but with more temporal than spatial. This will enable the *DVO Dust* to remove any size of spots. These filters may need more careful use, to not give unwanted artefacts.

The filter called '***Temporal 2***' is a special temporal filter that uses **minimum** amount of information from the current frame. This means that the processed signal will not vary as much as the normal temporal filter in terms of luminance/intensity.

Copy



The '*Copy Next*' and '*Copy Prev*' filters should be used for one frame in combination with a *key* area and *Global* mode to replace a big chunk of dirt, a big hole, or a flash frame with information from the next or previous frame.

Bypass

Setting the filter to *Bypass* will leave dirt **unprocessed**.

Use Adaptive Size

When the ***Use Adaptive Size*** button is enabled, the filter size automatically adjusts during processing according to the size of the dirt found.

Default : On

Filter Size

This sets the size of the filter on the current frame, so it is only required for spatial and temporal filters.

Use the numeric slider to define the filter size when adaptive filter sizing is not enabled. The larger the size of the dirt the larger this value should be.

Range : 0 to 15
Default : 7

Adaptation

The ***Adaptation*** toggle button allows you to turn the *adaptation* processing on/off.

When this button is **off**, *DVO Dust* works in ***global*** mode, filtering the whole image with the same fixed filter selected in the *Filter* menu.

> **!** Note that if the ***Adaptation*** button is **off** then none of the adaptation controls above will have an effect.

Motion

This numeric slider configures the degree of *motion sensitivity*.

Initially you can set it to 0 (most safety), for maximum motion sensitivity, and then increase it in steps if there isn't enough filtering in moving parts of the picture.

A value of 256 corresponds to no motion adaptation at all, which means that temporal filtering can be applied fully to moving parts of the image.

Range : 0 to 256
Default : 30

MDC

The ***MDC*** (*Motion Detection Current*) toggle button determines whether to look at just the previous and next field/frame, or to look at all of the previous,

current, and next field/frame.

Default : On

Having this option *on* ensures higher sensitivity and reduces artefacts down to a minimum.
For maximum filtering, the control may be set to *off*.

MDC filter configuration is done inside the *Setup* section.

Edge

This controls material edge *protection*.

Edge protection acts as a safety measure and reduces the possibility of false scratch detection. Some material may require this protection e.g. houses at a distance, a forest or material with a slight weave. By turning edge protection *on*, the built in *edge detector* will affect were DVO Dust filters and it will reduce filtering where it finds edges.

Default : On

Edge protection should normally be left on.

Further controls for defining thresholds for edges are available in the *Setup* tab.

Edge parameter configuration is done inside the *Setup* section.

Temporal Adaptation

Temporal Adaptation acts to exclude falsely detected dust/dirt from being processed. It does this by comparing dirt detected on the current frame with dirt detected on the previous frame (within a sizable window).

This toggle button turns temporal adaptation on/off.

Default : Off

The temporal adaptation settings can be found in the *Setup* tab.

Black / White

There are two separate and independent parameter groups controlling the processing for Black (dark) and White (light) areas of dust/dirt.

Enable Black / Enable White

White/black dirt removal can be enabled via the corresponding toggle button.

- *Enable Black* - to remove black/dark spots
- *Enable White* - to remove white/light spots

Both can also be enabled at the same time.

Default : On

> Note that if **neither** button is enabled then *DVO Dust* will **not filter at all!**

Use Adaptive

If on, sets white/black contrast to be *adaptive*.

Default : On

This will result in the algorithm determining which contrast setting is needed on a pixel-by-pixel basis.
When enabled the contrast controls change to give more, or less, effect of the adaptive contrast.

Adptv Threshold

Only applicable if ***Use Adaptive*** is **on**.

Range : -32 to 31
Default : 0

Fixed Threshold

Only applicable if ***Use Adaptive*** is **off.**

Range : 0 to 63
Default : 30

You should lower the thresholds if you have very low contrast white spots on light background, or black spots on dark background, and increase the thresholds if the luminance difference between the spots and the background is less:

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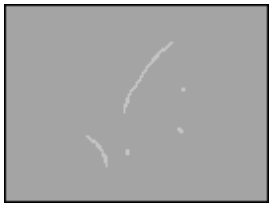
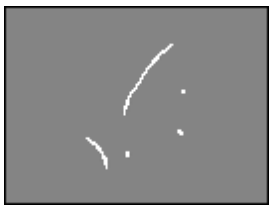


or
set the contrast threshold to a *low* value



or
set the contrast threshold to a *high* value

Contrast Adaptation Limits

The contrast adaptation *low* and *high* limit controls only work in the adaptive mode and are used to specify the range of contrast settings that the adaptation is allowed to work in.

The upper limit is normally set to the non-adaptive contrast setting you normally use. If both limits are set to the same value the result is exactly the same as when using non-adaptive contrast.

Low

Range : 0 to 63
Default : 5

High

Range : 0 to 63
Default : 30

Other Settings

Signal

This selects the signal (channel) within which scratches/dirt will be detected.

Values : Y,U,V,R,G,B,Y+U+V
Default : Y

The adaptation works on ***one channel only***, normally 'Y'. By setting the signal to 'R', for example, when only red scratches are visible, the *DVO Dust* will more precisely detect the dirt, minimizing the risk of affecting actual picture content.

Motion Estimation

This drop-down button allows you to choose the motion estimation.

Values : off, normal, best
Default : normal

When enabled, the motion estimation module gives a performance boost, both in dirt detection and concealment. This means that much more aggressive settings can be used without introducing smearing.

Scene Change

This drop-down button gives options for how to process the frames surrounding an edit/cut point:

- ***Inside*** - processes the frame before a cut using only the current and previous frame, and processes the frame after a cut using only the current and next frame. Stays inside the shot.
- ***Across*** - ignores cuts, use the previous, current, and next frame. Goes across shots.
- ***Bypass*** - doesn't process the frames before or after a cut.

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Values : Inside, Across, Bypass
Default : inside

Channels

This control is for selecting the channels from which dirt will be removed.

Normally the processing should be set to all channels, but in some cases, especially with small dirt, better results can be achieved by processing only one or two of the channels.

Values : Any combination of R,G and B.
Default : R,G,B

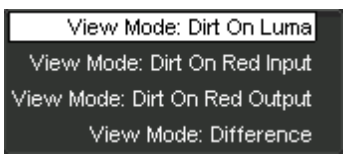
Setup

View

Turning on the ***View*** toggle button will provide an overlay/preview showing detected dirt. The type of overlay can be selected via the ***View Mode*** drop-down list:

Default : Off

View Mode



Values : Dirt On Luma, Dirt On Red Input, Dirt On Red Output, Difference

Default : Dirt On Luma

Where :

- ***Dirt On Luma*** - The detected scratches/dirt are high-lighted on a *monochrome* input picture with lowered luminance.
- ***Dirt On Red Input*** - The detected scratches/dirt are shown with *red* on the **unprocessed** input signal.
- ***Dirt On Red Output*** - The detected scratches/dirt are shown with *red* on the **processed** output signal.
- ***Difference*** - The *difference* between the unprocessed input and the processed output is displayed.

Colour

The drop-down list will default to the project setting for the input format. You need to set this control according to the material that you are working with. If the footage was shot with a *video* camera, select a **linear** format. If this control is not set correctly the material may not be processed properly.

Default : From Project

History Required

The *DVO Dust* effect is *recursive.*

> *Recursive* means the result for any given frame depends on the result of the previous frame(s).

For best results a certain amount of frame ***history*** needs to be built up, and this numeric slider is used to specify how many frames of history to use.

Range : 0 to 15

Default : 5 frames

Use Handles

The ***Use Handles*** button controls whether the history includes available

handles of a scene/shot. Normally, the history frames accumulated will terminate on a shot edit/event (start/end edit). There may be extra frames available (handles) before or after the start and end edit points of a shot however and these will be included as history if ***Use Handles*** is set.

If handles exist, full and precise processing will be available from the first frame of a clip.

Default : On

The remaining controls on the *Setup* page are used to optimize the processing further. These controls should only be used by experienced operators with a good understanding of the dirt and scratch concealment process.

Max Filter

Enable

In addition to the filter selected in the *Processing* tab, a separate *max filter* can be enabled.

The *Max Filter* will only be used when ***Use Adaptive*** is *enabled* in the *Processing* tab.

This is very useful when you have material with mostly small dirt and the occasional bigger stains.

Default : Off

Filter

Use this drop-down button to select the max filter with which to process **large stains**.

Values : Spatial, Mixed 1, Mixed 2, Mixed 3, Mixed 4, Temporal 1, Temporal 2, Copy Prev, Copy Next, Bypass

Default : Temporal 1

When the *Max Filter* is enabled, the normal filter used for the adaptive filter sizing will take care of the **small** dirt. When the upper size limit is reached it will automatically switch over to the filter selected here.

The filter used here would typically be a larger temporal filter.

The *Max Filter* can also be set to *Bypass*, which will leave big stains unprocessed. These can be processed later by a de-blotcher or 3rd party software.

Size

This specifies the size of the *spatial* part of the filter (for *spatial* and *mixed* filter types).

Use a large value when processing large bits of dirt.

Range : 0 to 15

Default : 3

Motion

Width

Motion ***Width*** is used in combination with the *Motion* control in the *Processing* section and defines the motion *adaptation* behaviour. When motion width is set to 0, the motion setting will be used as a threshold discriminating between moving and non-moving parts. When motion width is set to a non-zero value, the classification will change gradually from “no motion” to “full motion”. Motion width then specifies the size of the transition region.

Range : 0 to 255

Default : 30

MDC Scale

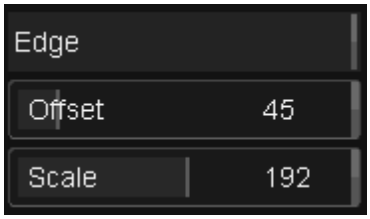
The **MDC** (*Motion Detection Current*) toggle button in the Processing section determines whether to look at just the previous and next field/frame, or to look at all of the previous, *current*, and next field/frame.

> Only used if MDC (Motion Detection Current) control enabled in the *Processing* section.

The *higher* the scale setting, the *more* filtering (less impact of the MDC algorithm).

Range : 0 to 15
Default : 8

Edge



> The Edge settings apply only if *Edge protection* has been enabled in the *Processing* tab.

Offset

The edge offset acts like a threshold, determining how well-defined edges have to be before the edge control has any effect. The smaller the offset value the sooner the edge control will have an effect.

Range : 0 to 255
Default : 45

Scale

Edge scale sets the sensitivity of the edge control. The higher the setting the more pronounced the effect of the edge control.

Range : 0 to 255
Default : 192

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Temporal

The temporal settings apply only if *Temporal Adaptation* has been enabled in the *Processing* tab.

The purpose of *temporal* adaptation is to **exclude** falsely detected dirt from processing by comparing it with the previous frame's detected dirt within a sizable window.

Strength

The strength level determines the amount of influence that the previous frame's detected dirt will have on exclusion of dirt detection in the current frame. A higher value will result in more dirt being excluded and less processing carried out.

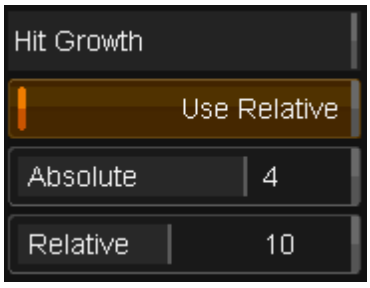
Range : 0 to 255
Default : 80

Trim Size

The trim size corresponds to a "window" in the previous frame which is searched for dirt to compare against the current frame. The smaller the window (trim size) the more filtering that will be achieved.

Range : 0 to 7
Default : 5

Hit Growth



The *Hit Growth* control is useful when the dirt in the image does not have very well-defined edges.

By increasing the hit growth the processor is told that the dirt is bigger than it actually appears. The result is that the soft edges also are processed.

Mode

Absolute

Use Relative button **off**.

The hit mask for all sizes of scratches are grown by the same amount as specified with the strength control

Range : 0 to 4
Default : 4

Relative

Use Relative button **on (default)**

In relative mode large scratches cause a larger growth.

Range : 0 to 15
Default : 10

The *Absolute* and *Relative* sliders control the amount of hit mask growth for each mode. The higher the value, the larger the area around the scratch that will be processed.

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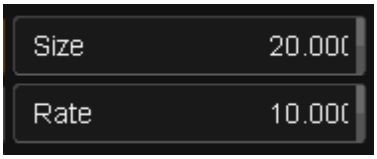
DVO Fix

DVO Fix facilitates the repair of specific areas and imperfections in a single frame, such as scratches, hairs and blotches. It also works for repairing larger damage such as punch holes, film tears and full frame reconstruction.

Using a brush or shape tool to select the damage, *DVO Fix* automatically repairs the selected area by comparing it to adjacent frames and applying motion compensation to recreate missing detail plus grain compensation to blend-in the recreated information. In addition to *Auto Fix* and manual *Clone*, an *Auto Clone* mode will automatically reposition and perform a best match of surrounding frames as an alternative to complete regeneration of content.

DVO Fix is not enabled by default. It is only enabled once an area to fix has been selected via the *Brush* or the *Rectangle* tool.

Brush Menu



The brush tool appears in the viewer as an oval shape. Use this tool to fix an area by either clicking or clicking *and dragging* the brush.

Size

The size tool allows you to resize the brush in order to fix smaller/larger areas.

You can also resize the brush by holding down the SHIFT key (on either the keyboard or control panel), the left mouse button and dragging. The brush size will

Range : 0.1 to 5000
Default : 20 pixels

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Rate

The rate tool applies to when you drag the brush, affecting how many brush 'stamps' are performed during the dragging motion.

Range : 2 to 1000
Default : 10

Rect Menu

The rectangle tool displays a cross-hair in the viewer, allowing you to draw a rectangle around the area that you want to fix. As soon as the rectangle has been drawn the DVO Fix effect will start processing.

Softness

The softness setting applies to the border outside of the rectangle and allows you to adjust how the outline blends into the surrounding area. This numeric slider takes values between 0-1.

Range : 0 to 1
Default : 0.2

Common Menu

The ***Use Handles*** button controls whether the tool uses *source handles* when rebuilding the frame. This is important at scene boundaries (edits) because the tool rebuilds using frames before and after the current frame.

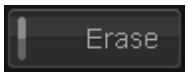
Default : On

If this button is on, and we are at a scene boundary (start or end of shot), if we have handles we will use them as part of the rebuilding process.

If there are no handles, or this button is off, no before (or after) frames will (or can) be used at the scene start (or end), and this impacts the *DVO Fix* result.

> Note that a *scene detected* timeline can have **no shot handles**, so ***Use Handles*** should be turned **off**.

Erase



The *Erase* button becomes enabled as soon as a fix is made to the current layer.

Default : Off

Turning on the *Erase* button will turn the brush into an ***eraser*** and applying this to the fixed area of your image will 'undo' previous fixes.

You cannot erase changes to a *mixed-down* layer.

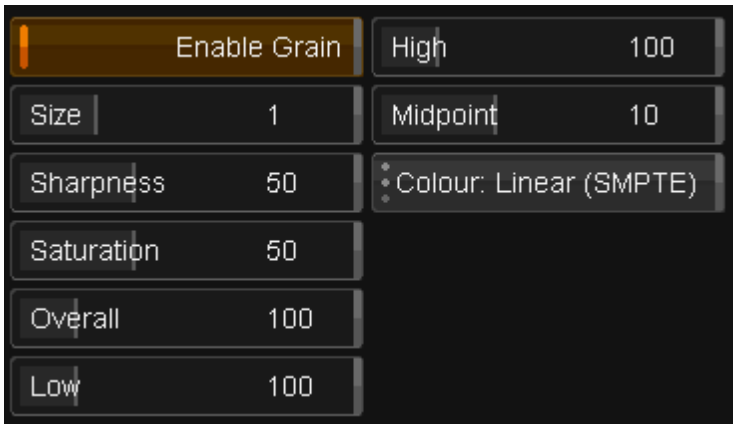
Mixdown

The *Mix Down* button becomes enabled as soon as a fix is made to the current layer.

Pressing *Mix Down* will make the changes to the current layer permanent, "burning" them into the image.

This tool allows you to apply fixes with different settings to the same area.

Enable Grain



Enable Grain will turn on the *grain compensation.* This adds grain to the 'fixed' area as appropriate, blending the changes into the scene.

Default : Off

The parameters are the same as for the DVO Regrain effect.

Colour

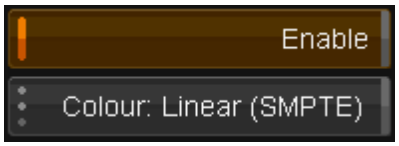
The drop-down list will default to the project setting for the input format. You need to set this control according to the material that you are working with. If the footage was shot with a *video* camera, select a **linear** format. If this control is not set correctly the material may not be processed properly.`

Default : From Project

DVO Flicker

DVO Flicker analyses the image sequence to remove brightness and chrominance fluctuations. These may be caused by varying exposure time, unsynchronised light sources, telecine tranfer, aging film stock and/or film chemical related issues.

> Chrominance flucuations are often termed *chroma breathing*.



The effect is enabled and the colour mode of the input set via the basic setup options :

Setup

The main configuration options are described below.

Mode

This parameter describes the general *nature* of the flickering. There is one setting curernt, *Location Invariant.* This is a flicker that occurs globally on a frame and is not isolated to portions within a frame.

> Future releases will include more *Mode* options.

Temporal Window

Values : 5, 7, 9 , 11
Default : 11

The *Temporal Window* specifies how many frames to use for the analysis.

> You should usually leave this at the default value.

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Variation Control

Numeric slider, value range 0-1.

Range : 0 to 1
Default : 0.5

The *Variation Control* parameter sets how precise and controlled we are when we make adjustments for flicker. The higher the value we use, the more care is taken. Lower values allow for *larger* adjustments (less *control*).

Lower values (allowing larger adjustments) are best for *simple* scenes. Larger settings may be required to take better account of more complex and dynamic scenes with more real-world intensity changes (e.g. high-speed pans etc.).

Enhanced Adjust

Values : Off, Low, Medium, High
Default : Medium

This will apply further processing enhancements to deal with small scale variations (both local and global).

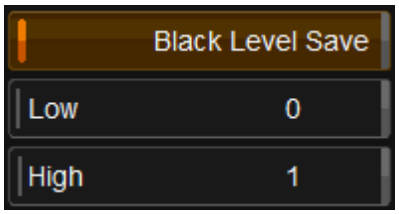
The *High* setting will apply a specialised *noise* filter and noticeably affect processing speed.

Max Adjust Limitation

Range : 0 to 10
Default : 4

This sets an adjustment limit to the general processing mode. The setting corresponds to a *percentage* (%) of the full signal.

Black Level Save



Black Level Save lets us enable specific processing to preserve black levels in the sequence.

If enabled, the *Low* and *High* parameters are used to assign the level of processing performed at the lower (blackest) end of the input sequence. Both *Low* and *High* are 10 bit numbers and limited to values between 0 and 100 (out of the full 10 bit range, 1024).

Low

Range : 0 to 100
Default : 0

If the input level is less than or equal to the setting for *Low*, no flicker adjustment is performed and the input signal is untouched.

High

Range : 0 to 100
Default : 1

If the input level is greater than or equal to the setting for *High*, full flicker adjustment is performed.

> In between these values, there is a *soft transition* between none and full processing.

Chroma

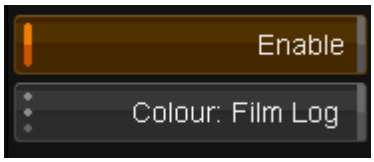
The *Chroma* button enables the removal of *chrominance flicker* (i.e."colour breathing").

> The *Chroma* toggle removes *luminance flicker* as well (if present). However, for best performance, leave *Chroma* off unless you have *chrominance* flickering to remove.

DVO Print Align

DVO Print Align uses a fully automatic process to *align* RGB separation prints, even if the offset varies over time.

Basic Setup



Enable

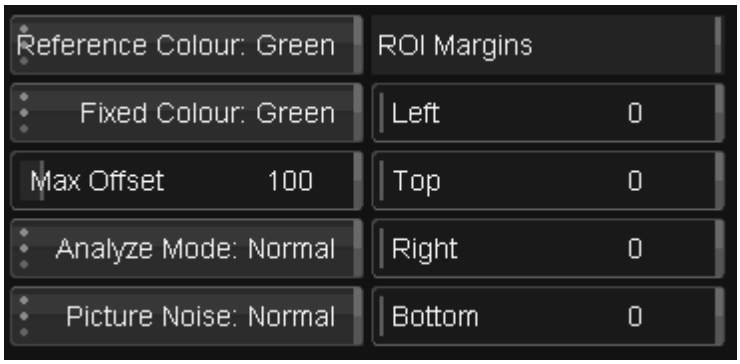
This toggle button allows you to enable/disable the effect. By default, as soon as the effect is added it is applied/enabled.

Colour

The drop-down list will default to the project setting for the input format. You need to set this control according to the material that you are working with. If the footage was shot with a *video* camera, select a **linear** format. If this control is not set correctly the material may not be processed properly.

Default : From Project

Controls



Reference Colour

Select the component (Red, Green or Blue) that should be used as the *reference*.

Values : Red, Green, Blue
Default : Green

This is normally set to ***Green*** as more *luminance* (detail) is available in the component.

Fixed Colour

Select the component (Red, Green or Blue) to which all other should be locked.

Values : Red, Green, Blue
Default : Green

Normally select the component that is most *aligned/stable*.

Max Offset

Set the maximum adjustment that can be done in pixels.

Range : 0 - 1000
Default : 100 pixels

Analyze Mode

Determines how extensive an analysis is performed.

Values : Normal, Extended
Default : Normal

- *Normal* - Works for most types of material
- *Extended* - For more difficult material and highest safety. Slower.

Picture Noise

Values : Low, Normal, High
Default : Normal

Describes the noise level of the image.

ROI Margins

Sets the region for analysis. For best results in some cases, the frame borders can be included in the analysis. However if picture content is not locked to frame borders, it might be necessary to exclude frame borders using the *Region Of Interest* control. Individual control for Left/Top/Right/Bottom in **pixels** (starting from the image edge).

Range : 0 TO 1000
Default : 0

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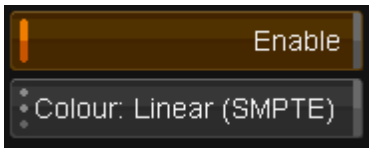
DVO Scratch

DVO Scratch processes vertical/continuous scratches.

These are typically those not being detected by dust/dirt removers, which are looking for random defects in the picture. The process is fully automatic and has an advanced detection algorithm with a fill-in result far superior to the normal process of hiding the defect using information from both sides of the scratch.

Basic Settings



Enable

This toggle button allows you to enable/disable the effect. By default, as soon as the effect is added it is applied/enabled.

Colour

The drop-down list will default to the project setting for the input format. You need to set this control according to the material that you are working with. If the footage was shot with a *video* camera, select a **linear** format. If this control is not set correctly the material may not be processed properly.

Default : From Project

Scratch Detection Parameters

Colour Mode

This determines the image channels detection is undertaken in.

Values : Y, R+G+B, R,G,B
Default : Y

where :

Y

Luminance detection only (fastest).

R+G+B

Separate detection in R, G and B channels.

Processing of each channel is based on the combined result from the detection.

R,G,B

Separate detection in R, G and B channels.

Each detection channel affects the corresponding processing channel.

Column Aggressiveness

First stage detector *aggressiveness*, which determines what columns (and pixels) are selected as scratch candidates to be processed. The *higher* the setting, the more aggressive.

Range : 0.0 - 1.0
Default : 0.5

Pixel Aggressiveness

Second stage detector *aggressiveness*, which is a modifier for pixel selection within the selected columns (from the first stage). The *higher* the setting, the more aggressive.

Range : 0.0 - 1.0
Default : 0.5

Scratch Type

Used to describe scratch *characteristics*. For moderate scratches, typically choose the specific scratch type evident in the material. In case of very *heavy* scratches, with emphasised edges, it can be advantageous to select *W+B*.

Values : White, Black, W+ B
Default : White

- *White* - for white (brighter) scratches.
- *Black* - for black (darker) scratches
- *W+ B* - for a mixture of black and white scratches

Do not use *W+B* as a default setting as it will sometimes process too much in the picture.

Scratch Width

Sets the width-profile for scratches.

Values : Thin, Normal, Wide
Default : Normal

If detection/processing is insufficient in areas which have *many* scratches close by, a *Wide* setting is recommended.

Image Noise Level

Characterises the level of noise in the image. Image noise will affect the accuracy of detection.

Range : 0.0 - 1.0
Default : 0.3

Processing Parameters

Colour Mode

This determines the colour mode of scratches we detect and process.

Values : RGB, YUV
Default : RGB

where :

- YUV - for *monochrome* scratches
- RGB - for *colour* scratches

YUV colour mode can not be used in detector mode *R,G,B*.

Base Strength

Determines base strength of the processing. This affects properties such as *smoothness* (as might be noticed in *wide* scratches).

Range : -3 to +3
Default : 0

Residual Strength

Determines the strength of processing the "residuals" e.g. very jagged scratch may need additional processing.

Range : 0.0 - 1.0
Default : 0.5

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DVO Steady

DVO Steady is used to reduce unsteadiness due to *film weave* during scanning or camera shakes during capture of footage. A two pass solution, including advanced motion estimation, provides better separation of random instability and pan/tilt movements.

DVO Steady can be used for both film and progressive video material.

The two passes are :

- Analyze - data collection
- Processor - actual processing

Analysis

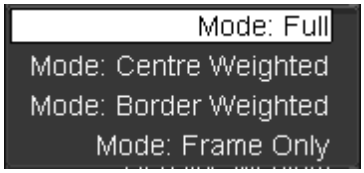
The first pass collects analysis data from the pictures. This is used in the processing stage.

The default settings work with most types of material, so just enable the *Analyze* control and let the shots be analyzed before processing takes over.

A **key frame** is added for every analyzed frame containing the analysis data. Complete analysis of the selected clip(s) should be done before looking at the result and adjusting the processing parameters.

Mode, Size and Density

Mode



The analysis looks at the complete frame with selectable focus instead of locking to a single point. This has several advantages, especially in archiving/ restoration applications with time constraints and problems like camera shake and film stretching.

The *Mode* control determines where the analyzer focuses within the frame.

Values : Full, Centre Weighted, Border Weighted, Frame Only
Default : Full

- Full - Complete frame
- Centre Weighted - Complete frame with priority towards centre
- Border Weighted - Complete frame with priority towards borders
- Frame Only - Only analyzes film frame edge (i.e. requires complete frame edges).
  This is further specified by the "Frame Only Border Enable" controls.

Frame Only mode is fastest.

Size

Sets analyzer size, which should be related to image size and motion.

Values : Small, Medium, Large
Default : Medium

Size affects processing time. The larger the size, the more processing required.

Size Setting	Suitable For
Small	SD - low/normal motion HD/2K - low motion Frame Only mode (any format)
Medium	SD - normal/high motion HD/2K - normal motion Default
Large	HD/2K - high motion 4K - low/normal motion

Density

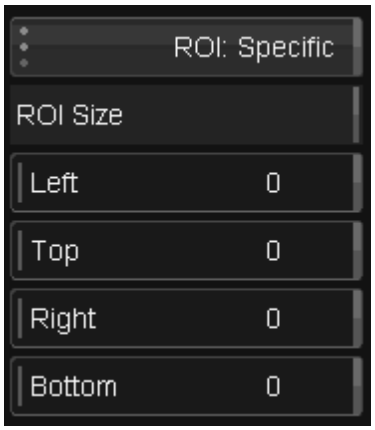
Determines the amount of analysis within the frame.

Values : Small, Medium, High
Default : Medium

- *Low* - Lowest safety margin - less accurate
- *Medium* - Normal safety
- *High* - Increased safety margin, more accurate

Processing time increases with the density.

Region of Interest



Set or find active area of picture - the region of interest to be analysed.

Values : Disabled, Specific
Default : Specific

- *Disabled* - use complete frame
- *Specific* - set region of interest via additional parameters below

ROI Size

This is the number of pixels from each edge where the frame (active area) starts.

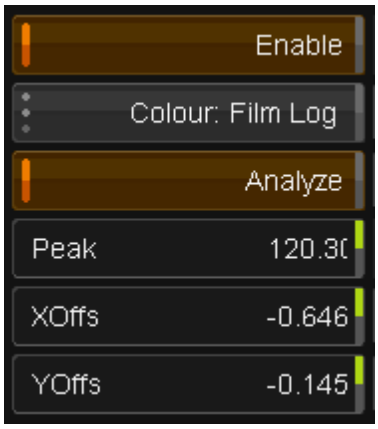
Range : 0 to 2048
Default : 0 pixels

Only borders which have visible “non-clipped" film frame edges must (can) be used and *Region of Interest* must be set to include those.

Processing

Processing parameters are applied to the pictures in accordance with the result from the *analyze* pass.

Basic Setup



Enable

This toggle button allows you to enable/disable the effect. By default, as soon as the effect is added it is applied/enabled

Colour

The drop-down list will default to the project setting for the input format. You need to set this control according to the material that you are working with. If

the footage was shot with a *video* camera, select a **linear** format. If this control is not set correctly the material may not be processed properly.

Default : From Project

Analyze

This toggle button enables the analysis function.

Currently, once analysis is complete, it should be turned off to enable rendering.

After analysis, if you change any of the processing parameters you will need to **re-run** the *analyse* step.

Peak / XOffs / YOffs

Once analysis is complete, these display some statistical results.

Aggressiveness

This parameter determines how *aggressive* the effect should be in attacking unsteadiness.

Range : 1 - 10
Default : 5

Low values are used for fine errors (small and quick) e.g. introduced by a scanner/telecine and does not try correct for slower and larger movements.

High values does not only take care of fine errors but also handles coarse errors (large and slow) like very old material or handheld/shaky cameras.

Reduction

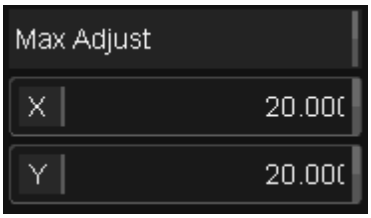
Used to set how much the unsteadiness should be decreased, with separate controls for *horizontal* (X) and *vertical* (Y) reduction.

Range : 0 - 100
Default : 100 %

Reduction is typically set to 100% to achieve maximum correction.

A bit of residual unsteadiness might be necessary to create a more natural result sometimes e.g. a camera shaking during frame capture resulting in motion blur.

Max Adjust



Sets a maximum limit (in pixels) for how much the process is allowed to adjust the stabilized frames, with separate *horizontal* (X) and *vertical* (Y) controls.

Range : 0 - 100
Default : 20 pixels

Motion Safety

Adaptively reduces the unsteadiness correction based on motion.

Range : 0 - 10
Default : 5

In high motion sequences, errors are more likely to occur. A high *Motion Safety* setting limits the allowed unsteadiness correction so that any errors will become less obvious.

A low setting ignores almost all motion.

Quality Safety

Adaptively *reduces* the unsteadiness correction in accordance with an analyze quality measure recorded during the analyse pass.

Range : 0 - 10
Default : 3

Under certain circumstances, the analysis may be complex and more difficult. This is signaled by a ***quality*** value.

When the analysis quality is low, errors are more likely to occur. In this case a high setting of the *Quality Safety* control **limits** the allowed unsteadiness correction in such parts of the material, so that any errors will become less obvious.

A *low* setting generally ignores the analysis quality.

Mask

Mode

Determines if and how the (shaking) borders should be masked.

Values : Disable, Follow Max Adjust, Specific
Default : Follow Max Adjust

where :

- *Disable* - Less safety. Less accurate.
- *Follow Max Adjust* - Use settings as per *Max Adjust* parameter

- *Specific* - use settings as per *Max Size* parameter

Size

Sets the mask size for Specific mode.

Range : 0 - 100
Default : 20

Soft Border

When *Enabled* (**default**), creates a soft border where the picture has been clipped.

A soft border can give a more natural look.

Zoom

Enlarges the picture according to selected mode.

Values : Disable, To Blanking, Fill Screen (Letter/Pillar Boxed), Fill SCreen (Full)
Default : Disable

- *Disable* - No zoom - **Default**
- *To Blanking* - Enlarges to specified blanking (see below)
- *Fill Screen (Letter/Pillar Boxed)* - Enlarges picture until either full vertical or full horizontal size is reached.
- *Fill Screen (Full)* - If necessary, makes a cutout to fill the complete frame (i.e. no black borders/blanking)

All modes keep the correct aspect ratio

Blanking

The *Blanking Mode* determines whether to use a masked or a full image.

Set blanking mode to *Specific* and specify *Blanking Size* if blanking (mattes) should be added to the processed pictures.

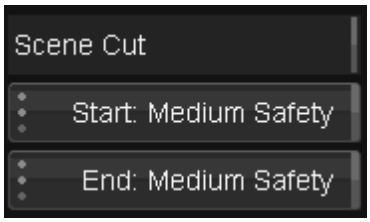
- *Disable* - Use complete image
- *Specific* - Apply blanking (mattes) according to Blanking Size controls - Default

Border Size

Range : 0 - 2048
Default : 0 pixels

This specifies the number of pixels from the each edge of the picture.

Scene Cut



Determines if the first/last frame of a scene/shot should be adjusted (Low/Medium/High Safety) or not (Fixed). Start and End mode are set separately.

Under certain circumstances (typically for very unsteady material), a *Fixed* setting might look wrong.

DVO Alias

DVO Alias takes care of the negative side effects of out-of-band vertical frequencies that show up on-screen as line flicker or “twitter”.

This is commonly seen in footage containing venetian blinds or car grills.

Parameters

Enable

This toggle button allows you to enable/disable the *DVO Alias* effect. By default, as soon as the effect is added it is applied/enabled.

Cutoff Frequency

This controls the amount of filtering and selects for the maximum vertical bandwidth to **keep**

A setting of 100% equals a full bypass.

You should start at a high value and lower until the flickering has been removed.

Range : 0 to 100
Default : 70%

Colour

The drop-down list will default to the project setting for the input format. You need to set this control according to the material that you are working with. If the footage was shot with a *video* camera, select a **linear** format. If this control is not set correctly the material may not be processed properly.

Default : From Project

DVO Aperture

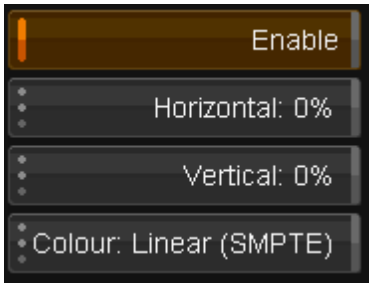
The *DVO Aperture* tool is a high quality frame-based spatial filter that increases the apparent sharpness of the picture.

This is a critical function when dealing with film scans and compensates for the loss of high frequency information generated in the film scanner. Problems requiring aperture correction arise in a scanning system when the frequency response falls off as the effective wavelength of the detail to be resolved in the image approaches the dimension of the scanning aperture.

The aperture processor normally increases response to high frequency content in the signal, thus adding *subjective* sharpness to the picture.

Aperture correction should therefore be employed as the **last** process in the chain.

Parameters



Enable

This toggle button allows you to enable/disable the DVO Aperture effect. By default, as soon as the effect is added it is applied/enabled.

Horizontal / Vertical

Separate controls for the amount of *horizontal* and *vertical* aperture correction. Allowed values are from 0 to 100% in increements of 10%.

Values : 0 - 100% (in 10% increments)
Default : 0 %

Colour

The drop-down list will default to the project setting for the input format. You need to set this control according to the material that you are working with. If the footage was shot with a *video* camera, select a **linear** format. If this control is not set correctly the material may not be processed properly.

Default : From Project

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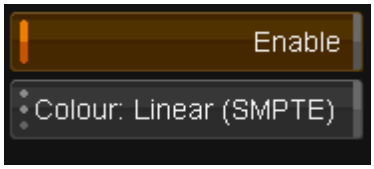
DVO Brickwall

DVO Brickwall helps reduce signal entropy making *compression* easier. It provides an extremely sharp cut-off beyond a user defined frequency, enabling you to create an accurately defined spectral content of material for various types of compression pre-processing.

This means that compression artefacts can be reduced and the quality of the compressed image can usually be greatly improved.



Enable

This toggle button allows you to enable/disable the *DVO Brickwall* effect. By default, as soon as the effect is added it is applied/enabled.

Colour

The drop-down list will default to the project setting for the input format. You need to set this control according to the material that you are working with. If the footage was shot with a *video* camera, select a **linear** format. If this control is not set correctly the material may not be processed properly.

Default : From Project

Parameters

Filter

Type

Values : Rect Sharp Film, Rectangular, Circular, Diagonal
Default : Rect Sharp Film

Size

Values : Small, Normal, Large
Default : Normal

Cutoff

This numeric slider allows you to precisely control the horizontal filtering of the luminance, as a percentage of the maximum bandwidth. A setting of 100% equals a full bypass.

Horizontal

Range : 10 to 100
Default : 70

Vertical

Range : 10 to 100
Default : 70

Sharpness

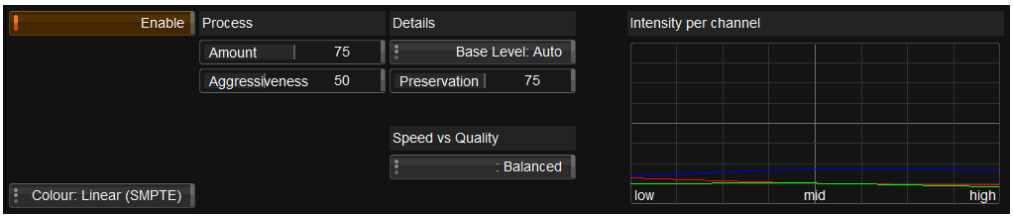
Range : 0 to 15
Default : 0

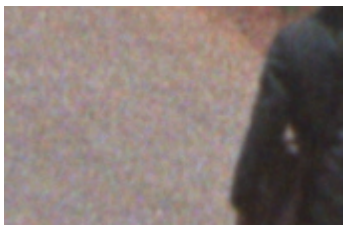
DVO Clarity

DVO Clarity is the fifth generation *noise* and *grain* reducer from Digital Vision and is designed to **automate** as much configuration as possible while still producing the highest quality output. The new *DVO Clarity* algorithms are designed to preserve detail and keep the original image sharpness, while being artifact free.

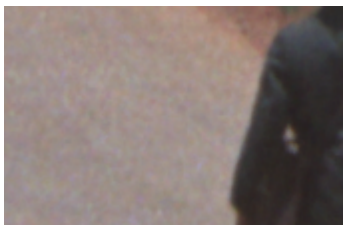
DVO Clarity includes :

- Automated *grain characteristic analysis*
- An enhanced *motion estimation* engine
- Detail enhancement
- A new *spatio-temporal filter*





Unprocessed



Processed

Enable

The *Enable* toggle button allows you to enable/disable the effect. By default, as soon as the effect is added it is applied/enabled.

Colour

The drop-down list will default to the project setting for the input format. You need to set this control according to the material that you are working with. If the footage was shot with a *video* camera, select a **linear** format. If this control is not set correctly the material may not be processed properly.

Default : From Project

Process

The *Process* group sets the basic processing parameters for the *DVO Clarity* algorithms.

Amount

Range : 0 to 100
Default : 75

The *Amount* parameter sets the overall level of noise/grain reduction.

Aggressiveness

Range : 0 to 100
Default : 50

Aggressiveness sets how far and how strongly we attempt to reduce noise/grain taking motion into account. The higher the value the more motion we ignore.

Care should be taken because at higher settings there is an increased risk of introducing motion *artifacts*.

Details

The *Details* group controls the level of *detail preservation* versus noise/grain reduction performed.

Base Level

Range : More, Less, Auto
Default : Auto

The *Base Level* sets the overall bias used for preserving detail. When set to *Auto* (the default), the algorithm will adapt **automatically**. Setting this to *Less* or *More* will change the overall detail preservation bias such that :

- *Less* - try and preserve ***less*** detail
- *More* - try and preserve ***more*** detail

Preservation

Range : 0 to 100
Default : 75

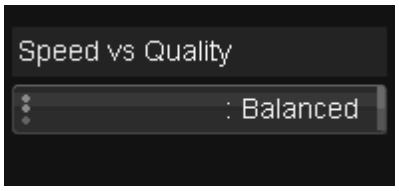
Given the *Base Level*, the *Preservation* parameter will fine-tune detail preservation. Higher settings preserve more detail.

Detail Preservation Workflow

Analyse the shot and note the amount and size of any noise artifacts (e.g. grain size). Based on this and the level of detail in the shot, we can choose settings for the *Details* parameters.

Detail Level	Example Settings
Low detail No detail below average noise/grain size	Base Level : Less Preservation : 0
Higher detail Detail observable below average size of noise/grain	Base Level : More Preservation : 100

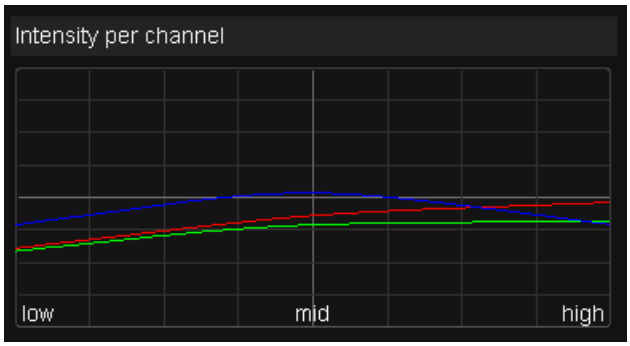
Speed and Quality



Range : Highest Speed, Highest Quality, Balanced
Default : Balanced

By default, we try to *balance* the quality of our output with the amount of processing time we use to produce it. The *Speed vs Quality* setting lets you adjust this trade-off between quality and processing time used.

Intensity per Channel



The intensity of noise and grain might be very different in the low, mid and high-lights of the picture. As part of the automatic analysis undertaken for each shot, *DVO Clarity* calculates the intensity distribution of noise/grain in each component (red, green and blue). The calculated distribution is displayed as a graph.

The graph is calculated *per shot*.

DVO Grain

Digital Vision *DVO Grain* algorithm is specifically designed to manage the look of film grain and to reduce unwanted electronic noise in film or video originated material. Uses include restoration, compression pre-processing, and image processing of new feature film, television and commercial material.

The *Grain* algorithm incorporates the Digital Vision Emmy award-winning PHAME advanced motion estimation technology along with edge-preserving 3-D spatio-temporal filters and temporal (recursive) filters to allow artists to produce clean, sharp pictures and to match the look of film grain from shot-to-shot (including grain matching for underexposed film). The process of adaptively selecting the best mix of spatial and recursive filtering for each pixel is unique to the *DVO Grain* algorithm.

This effect has four groups of parameters:

The ***Enable*** toggle button allows the complete effect to be turned on or off.

- Basic mode - basic settings for a quick de-grain
- Processing - specific processing options
- Key - keyed settings for chroma adaptation
- Setup - settings for various processing selections

Basic Settings and Presets

The DVO Grain *Basic* mode provides simple control of the grain/noise reduction without sacrificing performance. Basic mode is a good starting point before using the more advanced settings in the *Processing* and *Setup* tabs (if necessary).

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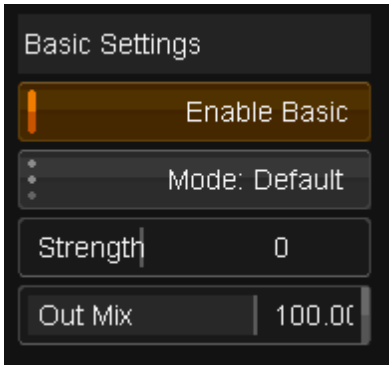


Enable Basic

The ***Enable Basic*** toggle button allows you to enable/disable *DVO Grain* basic mode.

When you edit any of the settings in the ***Processing*** or ***Setup*** tabs basic mode becomes *disabled* automatically. Similarly, when you select a *Mode* from the basic modes, all settings in the ***Processing*** or ***Setup*** tabs will be adjusted automatically to fit the selected mode and basic mode will be automatically *enabled*.

Presets

The *Mode* sets a basic preset level of grain reduction :

Values : Default, Film fine (or video), Film medium, Film coarse
Default : Default

Default is roughly equivalent to *Film medium*

Strength

The amount of grain/noise reduction is automatically set up in the basic mode. This slider control allows you to tune this, and increase or decrease the amount of grain reduction done.

Range : -2 to 2
Default : 0

Out Mix

The *Out Mix* control determines the *mix* between the processed image (with grain removed) and the input image to give the final output image.

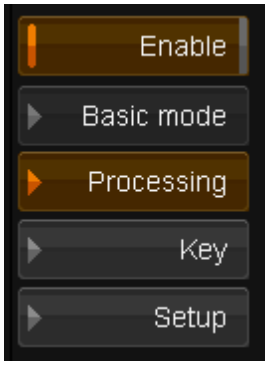
This makes it possible to mix in some of the original grain into the processed picture for a better film look.

Range : 0 to 100
Default : 100%

The default value of 100% results in an output with full grain removal, whilst a setting of 0% results in an output equal to the input image.

This control is also available in the *Processing* section and changes here are mirrored there.

Processing Filters



Temporal and spatial filters are available on the ***Processing*** screen.

DVO Grain utilizes a process that adaptively selects the best mix of spatial and temporal (recursive) filtering for each pixel.

Start with the *basic* mode enabled, selecting the most appropriate setting. If necessary, adjust the processing by disabling basic mode and continuing to the more advanced settings. In many cases, advanced mode will not be necessary.

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Temporal Filtering

The temporal or recursive filtering is the most effective filter in terms of reducing grain/noise.

Temporal Strength

Use the numeric sliders to set the amount/level of temporal recursive filtering in each channel.

Range : 0 to 15
Default : 7

Do not use higher settings than 11-12 except in extreme situations. Also note that both *Chroma trim* and *Pos/Neg trim* (see below) will *add* their values to these set strengths.

Temporal Global

Use this toggle button to turn ***Temporal Global*** on/off.

Default : Off

The DVO Grain is an ***adaptive*** grain and noise reducer. This means it disables the temporal/recursive processing of all moving edges within the image to assist in the reduction of motion artifacts.

Temporal Global enables filtering of the whole picture regardless of motion for maximum temporal filtering.

Temporal global should normally be set to *Off* and only used in extreme situations, or to create a motion smearing effect.

Enabling ***Temporal Global*** might cause excessive smearing in the picture.

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In addition to the above controls, the motion sensitivity control on the *Setup* section adapts the temporal filtering in respect to grain size and intensity

Spatial Filtering

Edge-preserving spatial filtering complements the adaptive temporal filters by processing grain and noise in portions of the image that are detected as being in motion, while leaving non-moving areas unaffected. The spatial filtering is done before application of the temporal filters and works in unison with DVO Grain's motion processing.

Spatial Strength

This is the overall level of spatial filtering applied in each channel. Normally, they should match the temporal strength.

Range : 0 to 15
Default : 7

Spatial Size

The ***Spatial Size*** drop-down lists adjust the spatial size of the grain/noise, in ***pixels***, for each channel.

Values : 1,3,5,7,9
Default : 7

Setting R, G, B spatial size *equally* will give best performance

Spatial Threshold

The spatial threshold determines *when* to filter, depending on the intensity of the surrounding pixels.

Range : 0 to 100
Default : 7

Use the spatial threshold sliders to adjust the setting for each channel.

If there is a high enough intensity/contrast (e.g. an *edge*) between the grain/noise and surrounding pixels, filtering will **not** occur.

A low setting will only affect low intensity pixels (flat areas). A high setting will start to affect high intensity pixels (edges)

Spatial Global

This enables filtering of the *whole* picture by switching off the motion adaptation.

Use this toggle button to enable/disable global spatial filtering.

Default : Off

A moderate level of *global spatial* filtering can be used as a *basic* level of grain and noise reduction before using the temporal filtering (also see Global Balance).

This may cause excessive softening of the picture if the spatial filter is not set up correctly.

Temporal filtering works in areas with no or little motion.
Spatial filtering works in areas of motion.
Global enable the filters to work on the entire picture.

The R, G, B Strength controls should normally be ganged and adjusted together. They typically need to be adjusted by the same amount.

Optimising the Spatial Filter

1. Set Spatial Strength, Size and Threshold to their maximum
2. Turn Spatial Global on
3. Adapt the spatial filter to the grain/noise size by decreasing the spatial size settings to as low as possible whilst still resulting in grain/noise being removed
4. Decrease spatial threshold until edges are not affected (a typical setting is between 8-20%)
5. Decrease spatial strength until the desired level of spatial filtering is achieved
6. Decide whether *Spatial Global* should be left on (filtering of the whole picture), or turned off (filtering only in areas with motion).

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Starting with enabling *Basic mode* and selecting one of the available preset modes will automatically set up spatial threshold/size

Chroma Trim

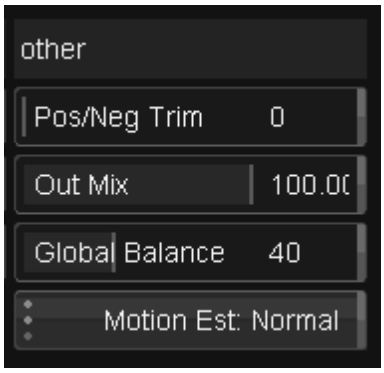
The *Chroma Trim* controls are used to adjust the grain/noise reduction on each selected colour. This allows for the boosting or cutting of both the spatial and temporal filter settings within the selected colour.

Range : -8 to 7
Default : 0

The colours 1, 2, 3, are selected via the key tab, as described in the *Chroma Adaptation* section below.

Having a temporal strength of 7, setting up chroma adaptation for a red colour and corresponding trim to +2, will set the temporal strength to 7+2=9 for areas in the picture that contain the selected red colour.

Other



Pos/Neg Trim

The *Pos/Neg Trim* control works in conjunction with the Pos/Neg mode controls in the *Setup* section. Having selected the mode and luma thresholds

in the *Setup* section, use the *Pos/Neg Trim* control to adjust the noise reduction levels equally for all RGB channels in *highlights* (Neg) or *lowlights* (Pos).

Range : 0 to 7
Default : 0

Having a temporal strength of 7, setting up neg mode to neg and the pos/neg trim to +2, will set the temporal strength to 7+2=9 for *highlights*.

Processing is slower using trims. Even if Temporal/Spatial strengths are at 0, Pos/Neg Trim will still add to this and result in processing within highlights or lowlights.

Out Mix

This control is the same as the *Out Mix* control available in the basic mode tab, and changes here are mirrored there.

Range : 0 to 7
Default : 0

Global Balance

Global Balance allows a combination of the *basic* level of spatial filtering and motion adaptive spatial filtering.

Maximum filtering according to spatial strength is achieved in areas with motion.

The *Global Balance* slider allows you to to set a minimum level of spatial filtering, rather than having the level set entirely based on motion detection. If the slider is set to 0, then parts of the image with no motion will receive no spatial filtering. Increasing the slider increases the spatial filtering of areas with little or no motion.

Range : 0 to 100
Default : 50

Motion Estimation

DVO Grain is a fully *motion compensated* noise/grain reducer. This means that much more aggressive settings can be used without introducing smearing.

The motion estimation drop-down button allows you to set the motion estimation to :

Range : Off, Normal, Best
Default : Normal

The *Best* setting is good for fast motion but is slower than *Normal*. In almost all cases, *Normal* or *Best* should be used.

Key (Chroma Trim)

The *Key* (*chroma adaptation)* function can be used to adjust the levels of grain/noise reduction in user selectable colour regions.

For example, this feature can be used for greater grain/noise reduction in sensitive areas such as a blue sky, or less noise reduction in skin tones.

Three independent channels of chroma adaptation allows adjustment of noise reduction levels (both spatial and temporal) in the regions of the selected colour.

These selectable colours are labelled 1, 2 and 3.

Only colours with a saturation higher than approximately 5% will be detected.

Use the ***Key*** screen to adjust the hues and widths to isolate the colours in each channel:

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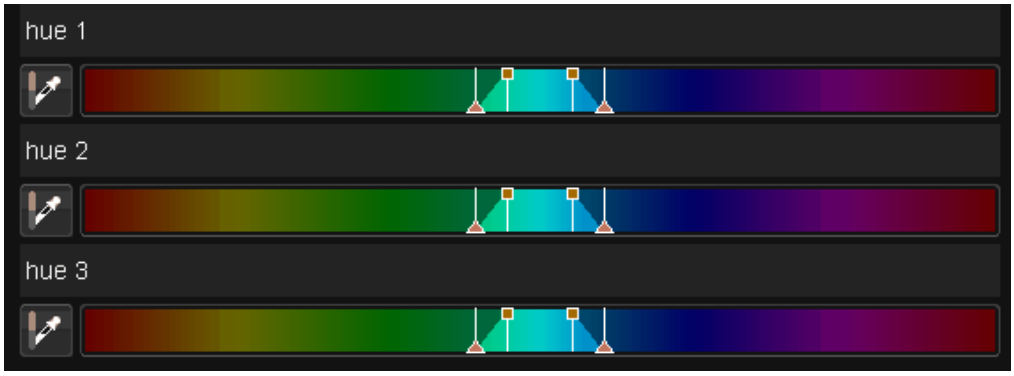
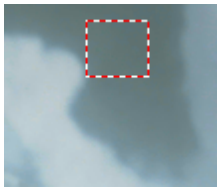


Click a colour picker toggle button to enable/disable colour picking from the displayed monitor image :

Enable picker	
Pick area of colour from image using the mouse	

You can also select the selected hue by clicking on the hue bar with the left mouse button and dragging the hue bar left and right :

Drag on hue bar and/or orange box indicators to alter hue selection.

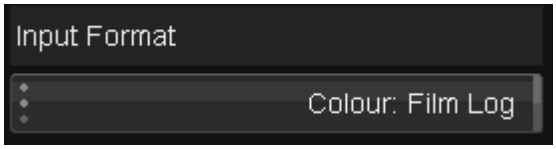
After selecting the colours using the key tab, the corresponding *Chroma Trim* control in the ***Processing*** tab may be used to adjust the grain/noise reduction for each selected colour. *Chroma Trim* allows for the boosting or cutting of both the spatial and temporal filter settings within the selected colour.

Even if Temporal/Spatial strengths are at 0, Chroma Trim will still add to that number and resulting in processing within selected colour.

Setup

The Setup screen allows various other effect parameters to be configured.

Colour



The drop-down list will default to the project setting for the input format. You need to set this control according to the material that you are working with. If the footage was shot with a *video* camera, select a **linear** format. If this control is not set correctly the material may not be processed properly.

Default : From Project

History Required

The *DVO Grain* effect is *recursive.*

> *Recursive* means the result for any given frame depends on the result of the previous frame(s).

For best results a certain amount of frame ***history*** needs to be built up, and this numeric slider is used to specify how many frames of history to use.

Range : 0 to 15
Default : 5 frames

Use Handles

The ***Use Handles*** button controls whether the history includes available *handles* of a scene/shot. Normally, the history frames accumulated will terminate on a shot edit/event (start/end edit). There may be extra frames available (handles) before or after the start and end edit points of a shot however and these will be included as history if ***Use Handles*** is set.

If handles exist, full and precise processing will be available from the first frame of a clip.

Default : On

The remaining controls on the *Setup* page are used to optimise the processing further. These controls should only be used by experienced operators with a good understanding of the dirt and scratch concealment process

Motion Sensitivity

This drop-down allows you to set the level of sensitivity.

Values : Low, Medium, High
Default : Medium

Motion sensitivity adapts the temporal filtering with respect to grain size and intensity.

Motion sensitivity has great impact on processing and the type of filter (spatial/temporal) being used.

It may be better to set *Motion Sensitivity* to **Low** rather than just increasing filter strengths.

Spatial Filter

Spatio - Temporal

Enabling this extends the spatial filter to become a **3D spatio-temporal filter**, by including the use of *temporal taps.* This can enhance the noise reduction achieved.

Default : On

Temporal Mix

The temporal mix controls the balance between the spatial and temporal taps of the spatio-temporal filter.

Values : Low, Medium, High,Full
Default : High

This setting affects the noise reduction achieved by the spatio-temporal filter, with more noise reduction for the higher settings.

For fast motion material and a higher than default spatial filter threshold setting, a high temporal mix setting may increase the probability of artifacts. In such cases, this setting may be lowered. For a lower than default spatial filter threshold setting, the *Full* setting may be used.

The default setting *High* should be safe in most circumstances.

Spike

This setting enhances the spatial filter performance by incorporating a *spike* adaptation.

Values : Off,Narrow,Medium,Wide
Default : Medium

The setting relates to the grain/noise characteristics. A low setting (e.g. *Narrow*) is suitable for smaller grain and noise sizes and/or less pronounced variations in amplitudes.

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A high setting (e.g. *Wide*) is suitable for larger grain/noise and/or more pronounced variations in amplitudes.

Setting *spike* to *Narrow* in conjunction with setting *Motion Sensitivity* to *High* and *Motion Estimation* (in the ***Processing*** screen) to *Best* can help avoid motion estimation errors caused by noisy / grainy material.

Pos/Neg Profile

The Pos/Neg profile allows the user to select the amount of noise reduction (both spatial and temporal) applied to the highlights or lowlights within the image.

This function is important when dealing with grainy images in positive or negative film stock.Positive film will generally show more grain in the lowlights whilst Negative film will generally show more noise in the highlights.

Neg

Values : Positive,Negative
Default : Positive

Parameters :

- *Positive* - more grain reduction in lowlights
- *Negative* - more grain reduction in highlights (Film mode)

Having selected the mode, you need to set the *Pos/Neg Trim* level on the ***Processing*** screen. This will adjust the noise reduction levels equally for all RGB channels in highlights (Neg) or lowlights (Pos).

Luma Thresholds

The range of luminance values affected by the *Pos/Neg Trim* can be set by two luma thresholds.

Luma Threshold Low

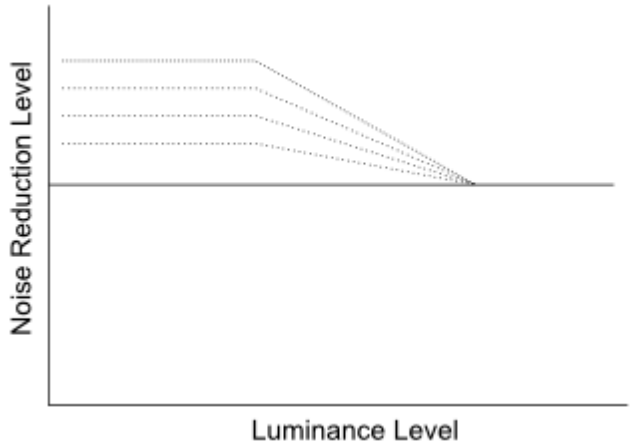
Range : 0 to 50
Default : 0% Luma

Luma Threshold High

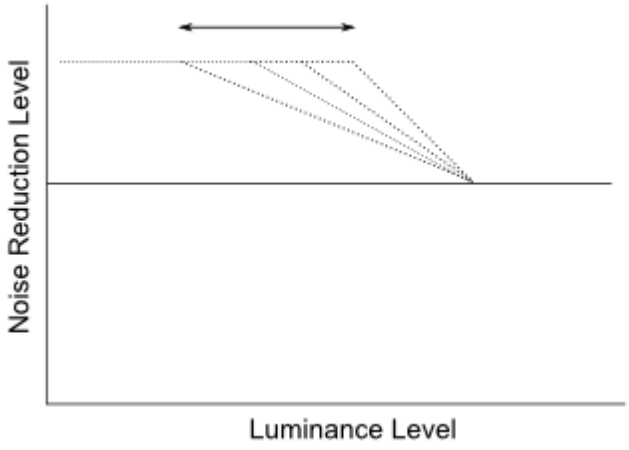
Range : 50 to 100
Default : 100% Luma

These two thresholds determine the point in highlights and lowlights where the Pos or Neg trim is at its maximum.

The effect of the Trim will gradually decrease between these two points.



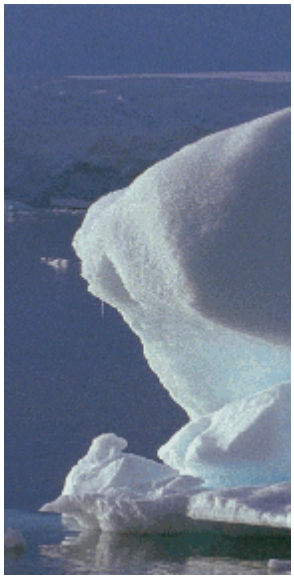
Trimming the Grain/Noise Reduction level for Positive film



Trimming the Grain/Noise Reduction level for Positive film

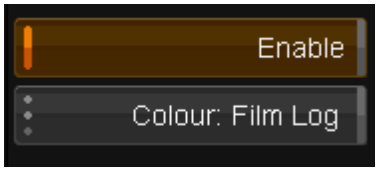
DVO Regrain

DVO Regrain allows you to quickly set up and generate natural looking film grain. The intuitive controls enable you to match almost any type of film stock by setting the grain size and sharpness as well as matching the characteristics of highlight and lowlight intensity behaviour.



Before

After



Enable

This toggle button allows you to enable/disable the effect. By default, as soon as the effect is added it is applied/enabled.

Colour

The drop-down list will default to the project setting for the input format. You need to set this control according to the material that you are working with. If the footage was shot with a *video* camera, select a **linear** format. If this control is not set correctly the material may not be processed properly.

Default : From Project

Parameters

Size

Desired pixel size of the grain.

Range : 0 to 3
Default : 1 pixel

Sharpness

Determines the sharpness of the edges of the grain.

Range : 0 to 100
Default : 50%

Saturation

Determines the colour saturation of the grain.

Range : 0 to 100
Default : 50%

Overall

Overall amount of grain added.

Range : 0 to 400
Default : 100%

Low

Specifies the amount of film grain to be added in low light (dark) areas. The film grain added is in addition to the overall film grain, as specified in *Overall* Amount (above).

Range : 0 to 400
Default : 100%

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High

Specifies the amount of film grain to be added in high light (light) areas. The film grain added is in addition to the overall film grain, as specified in *Overall* Amount (above).

Range : 0 to 400
Default : 100%

Midpoint

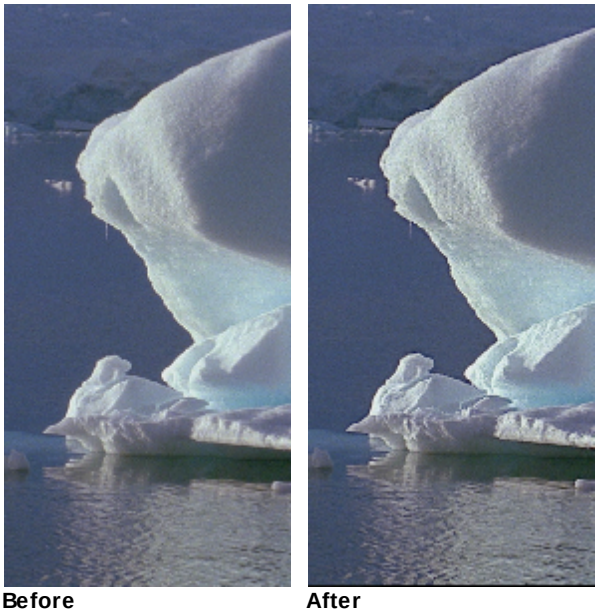
Midpoint Balance controls the **amount** of the frequency range considered to be high light and low light, and thus affects how the low light and high light amounts are applied.

Range : 0 - 20
Default : 10

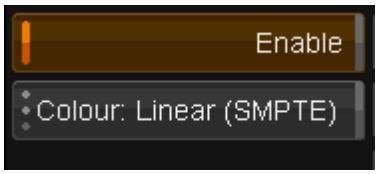
To treat more of the spectrum as high light, enter a low number. To treat more of the spectrum as low light, enter a positive number. If "10" is entered, the gradual change between low and high lights is completely linear.

DVO Sharpen

DVO Sharpen is an advanced sharpening tool that greatly enhances out-of-focus shots. It uses *adaptive* picture analysis and processing to yield excellent results without the common side effects associated with standard algorithms (such as amplified grain, noise, or halos around areas that were already sharp).



Before **After**



Enable

This toggle button allows you to enable/disable the *DVO Sharpen* effect. By default, as soon as the effect is added it is applied/enabled.

Colour

The drop-down list gives two choices of input colour format, *log* or *video*. You need to set this control according to the material that you are working with. If the footage was shot with a video camera, select video. If this control is not set correctly the material may not be processed properly.

Default : From Project

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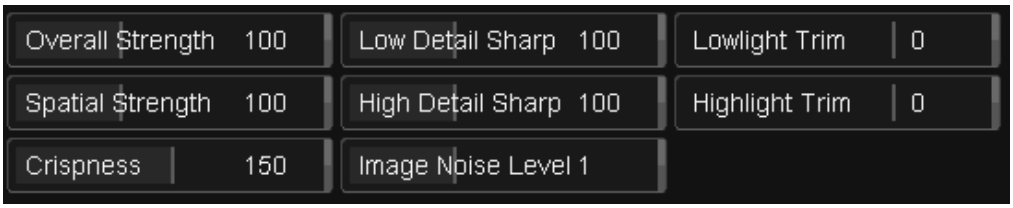
Parameters



Overall Strength

Numeric slider, value range 0-200.

Range : 0 to 200
Default : 100

Spatial Strength

Numeric slider, value range 0-200.

Range : 0 to 200
Default : 100

Crispness

Numeric slider, value range 0-200.

Range : 0 to 200
Default : 150

Low Detail Sharpening

Numeric slider, value range 0-200.

Range : 0 to 200
Default : 100

High Detail Sharpening

Numeric slider, value range 0-200.

Range : 0 to 200
Default : 100

Image Noise Level

Numeric slider, value range 0-2.

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Range : 0 to 2
Default : 1

Low Light Trim

Numeric slider, value range -25 - 0.

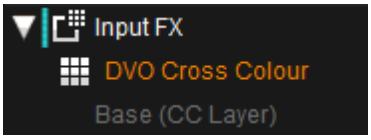
Range : -25 to 0
Default : 0

High Light Trim

Numeric slider, value range -25 - 0.

Range : -25 to 0
Default : 0

DVO Cross Colour



Cross Colour (also known as *Chroma Crawling*) is a defect that results from *crosstalk* between the *chrominance* and *luminance* components of a composite video signal (PAL or NTSC). Once a video signal has been in the composite domain, this defect is not easily removed.

Parameters

Enable

When enabled, *DVO Cross Colour* will process the input as per the settings described below.

Aggressiveness

Allows the tuning of the degree of removal.

> If we increase these parameters too much we increase the possibility of introducing *artifacts*.

Spatial

When the *Temporal* setting is *decreased*, The *Spatial* control may be **increased** instead to remove cross-colour at the expense of slight spatial chroma bleeding.

Temporal

Increase for maximum cross-colour removal. Reduce if temporal chroma bleeding becomes too intrusive.

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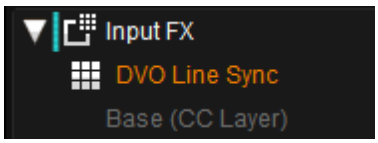
DVO Line Sync



Line sync or line *jitter* is a very common problem with archived analog video tape.

It is typically caused by the lack of (or disturbances with) *line synchronization pulses* which prevents the the video tape recorder from locating the actual start and end of each line. This causes **random line displacement** (jitter).

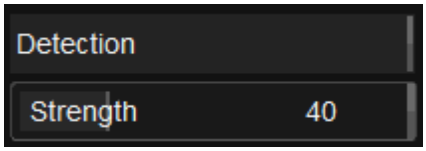
The most visible effect is that vertical edges appear to be *jagged*. The jitter can range from +/-1 pixel to more than +/-5 pixels in severe cases. *DVO Line Sync* automatically detects and corrects these line displacements as well as any stretching it causes.

Parameters

Enable

When enabled, *DVO Line Sync* will process the input as per the settings described below.

Detection Strength



Detection *Strength* controls the degree of jitter detection with a higher number meaning a higher degree of detection.

If the *Strength* parameter is pushed too high, we may correct lines unnecessarily and introduce jitter. Analyse the resulting output before committing to a long render.

Note that the processing time is dependent on detected (and processed) lines. The more line sync issues we find, the longer it will take to process.

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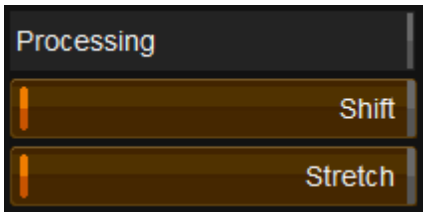
Processing



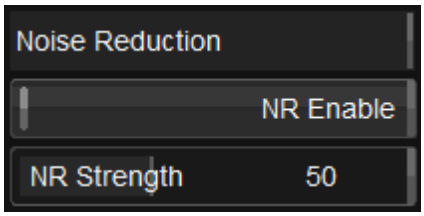
Shift

Enables correction of pixel shifting (left/right)

Stretch

Enables correction of stretched/shrunken lines.

Noise Reduction



This is *Adaptive Noise Reduction* with *non-recursive spatio-temporal filtering* so ghosting will not occur.

> Note that processing time will be considerably higher when active since all lines have to be processed.

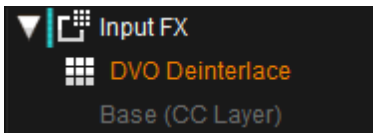
NR Enable

Enables *Noise Reduction*, independent of shift/stretch detection and correction.

NR Strength

Sets the amount of *Noise Reduction* to perform.

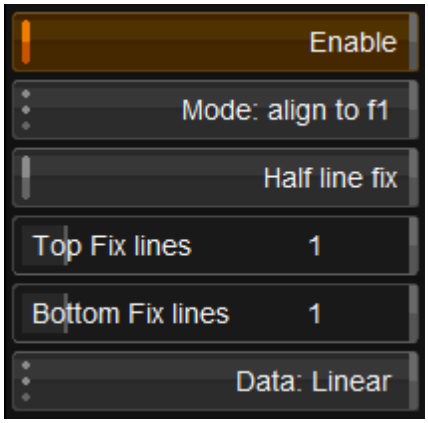
DVO Deinterlace



DVO Deinterlace accurately creates progressive frames from interlaced video originated material. The de-interlacer can maintain the fluid motion present in video (e.g. 50p delivery from a 50i source) or create a film look (e.g. 25p delivery from a 50i source).

DVO Deinterlace uses advanced *motion adaptation* techniques to preserve sharpness while also avoiding jaggedness typically associated with similar processes.

Parameters



Enable

When enabled, *DVO Deinterlace* will process the input as per the settings described below.

Mode

Values : align to f1 , align to f2 , double rate f1 + f2 , double rate f2 + f1

Default : align to f1

The *Mode* control sets which field(s) the progressive frame is *aligned to* in terms of motion and content.

align to f1	Keep field 1 and align the missing information in the new frame to the contents of the original field 1
align to f2	Keep field 2 and align the missing information in the new frame to the contents of the original field 2
double rate f1 + f2	Make a complete progressive frame using every single field using the above methods. This doubles the number of frames. Top (f1) field first.
double rate f2 + f1	Make a complete progressive frame using every single field using the above methods. This doubles the number of frames. Bottom (f2) field first.

Half Line Fix

In an analog video signal there may be a visible *half lines* (unless removed when captured) i.e. half the line is blanked and the rest of the line contains image information. Including the half line when de-interlacing is usually unwanted.

To remove the blanked part, enable *Half Line Fix* and select the line(s) to address for top (*Top Fix Lines*) and bottom (Bottom Fix Lines). This will ensure that the blanked part of the line is not visible in the final image.

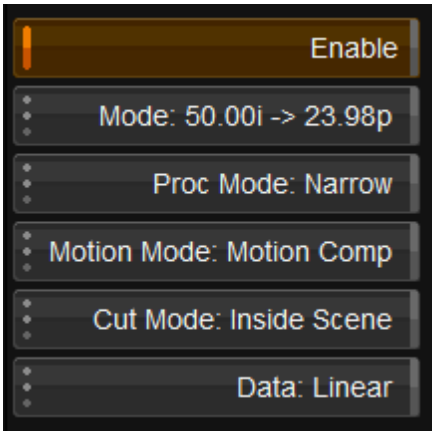
Data

Values : Linear , Log
Default : From Project

Process using the selected the data format.

DVO Twister

DVO Twister is an advanced software *standards conversion* tool.



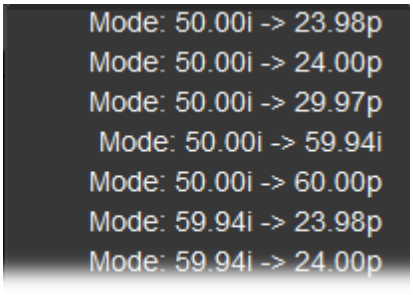
To use *DVO Twister*, you should set up a project and composition configured for your **target** format.

Parameters

Enable

This toggle button allows you to enable/disable the *DVO Twister* effect. By default, as soon as the effect is added it is applied/enabled.

Mode



The mode option lets you choose the *source* and *target* format for the conversion. Available modes include :

50i to 23.98p
50i to 24.00p
50i to 29.97p

50i to 59.94i
50i to 60.00p

59.94i to 23.98p
59.94i to 24.00p
59.94i to 25.00p
59.94i to 50i
59.94i to 50p

50p to 60p
60p to 50p

23.98p to 29.97p
23.98p to 50.00i

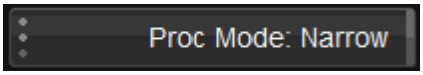
29.97p to 23.98p
29.97p to 50.00i

16.00p to 24.00p
16.00p to 25.00p

18.00p to 24.00p
18.00p to 25.00p

20.00p to 24.00p
20.00p to 25.00p

Processing Mode

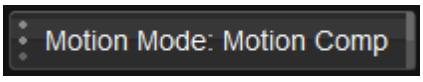


Values : Narrow, Medium, Wide, Auto
Default : Narrow

The *Processing Mode* affects how *motion* is detected and selects between three main modes. The *Auto* mode automatically selects the most appropriate setting based on the source and target mode chosen.

> ! Only has an effect when *Motion Mode* is set to ***Motion Comp***.

Motion Mode



Values : Motion Comp, Interpolated, Nearest Frame
Default : Motion Comp

This determines how the images are recreated in the target format.

Motion Comp

This uses motion compensation and is the default. This allows the accurate recreation of fields and frames using the Digital Vision *Phame* motion vector algorithms.

Interpolated

This is a simple method that recreates correct target fields and frames by careful mixing of the input source. This method will often produce a lower quality result than the motion compensated approach (blurs, jerky

motion). Try if Motion Comp fails.

Nearest Frame

This uses no processing other than skipping or repeating frames to output the same clip duration.

Cut Mode

Values : Across Scene, Inside Scene, Inside Scene Frame Aligned
Default : Inside Scene

DVO Twister has an internal **scene detector** and the *Cut Mode* determines how images adjacent to a scene cut are *aligned*.

Across Scene

This ignores the cut and *blends* the images. This will not provide in a clean cut but is sometimes preferred as it is the most accurate representation in terms of alignment in time.

Inside Scene

This aligns the cut to the nearest video field.

Inside Scene Frame Aligned

This aligns the cut to the nearest output video/film frame and so results in the cleanest cut.

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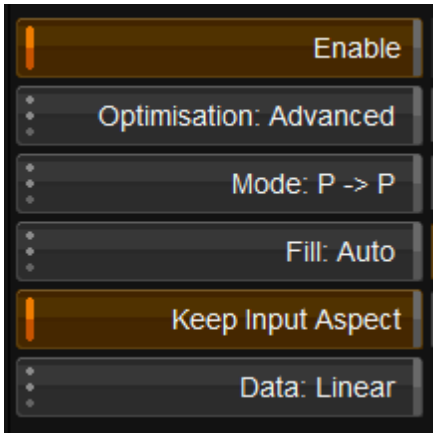
DVO Upscale

DVO Upscale provides optimised up-scaling of material and is of specific value when converting from SD to HD.

The algorithm maintains the high quality of edges, including diagonals, and is especially useful for graphics.

Basic Parameters



Enable

The *Enable* button must be on to enable processing.

Optimisation

Values : Fast , Advanced
Default : Advanced

Optimisation determines the balance between speed and quality. In *Advanced* mode a special algorithm is used for the high frequency parts of the image to reduce scaling artifacts. In *Fast* mode this algorithm is disabled to gain speed at the expense of quality.

Mode

Values : P -> P , i -> P , i -> i
Default : P -> P

DVO Upscale has an internal *de-interlace* function in order to deal with multiple formats.

- P is *Progressive*
- i is *interlaced*

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The setting of progressive or interlaced here is not the same as video/image format (e.g. HD 1080i 50). It only describes how pictures were captured and whether to maintain this.

The *project* must set up to render **frames** even if the output mode is *interlaced*. Internally, the effect needs to use a progressive (frame based) format for optimal results when both input and output are interlaced.

Fill

Values : Auto , Vertical , Horizontal , Both
Default : Auto

Controls how the input picture is mapped (scaled) to the output picture.

Auto	Scales input picture until vertical or horizontal limit of the output picture is reached, without changing aspect ratio.
Vertical	Fills the output picture vertically without changing aspect ratio. E.g. scaling a SD 4:3 picture to an HD 16:9 output format will result in a pillar-box format.
Horizontal	Fills the output picture horizontally without changing aspect ratio. E.g. scaling an HD 16:9 picture to a 2k 4:3 picture will result in a letter-box format.
Both	Fills the output picture both vertically and horizontally. Does not keep the original aspect. Overrides the “Keep Input Aspect” E.g. scaling an SD 16:9 anamorphic to HD 16:9 will result in a full 16:9 format.

Keep Input Aspect

Reads clip properties and keeps the input aspect ratio and will also automatically compensate for non-square pixels.

This should normally be enabled, especially when up-converting from standard definition sources (525 or 625).

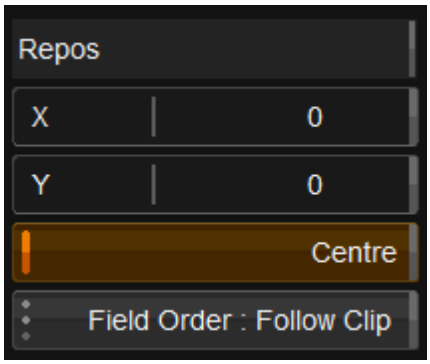
If the clip has an *incorrect aspect ratio* you will have to change the **clip properties** in the library (*Library/Properties*).

Data

Values : Linear , Log
Default : From project

Set the clip data format.

Other Parameters



Repos

X and Y repositioning after *Fill* mode is chosen.

Centre

Values : On , Off
Default : On

This centres the scaled image on the output picture. If disabled it maps the scaled image on the output picture from the *lower left* corner.

Field Order

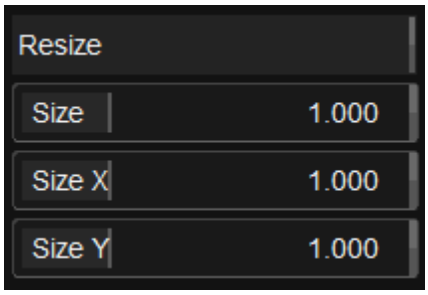
Values : Follow Clip , f1:f2 , f2:f1
Default : Follow Clip

The Field Order parameter sets the input field order in time for *interlaced* input.

Follow Clip	Uses the clip properties (assumed correct).
f1:f2	Assumes top field first.
f2:f1	Assumes bottom field first.

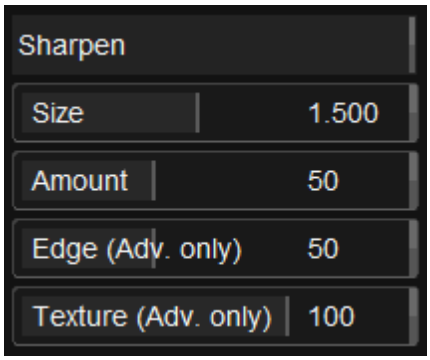
This setting is *independent* of the output field order as set in the **project properties**.

Resize



X and Y scaling after *Fill* mode is chosen

Sharpen



Adjusts post-scale crispness.

The controls differ between *Advanced* and *Fast* modes.

Size

Values : 0.5 - 2.0
Default : 1.5

Adjusts the sharpening radius.

Amount

Values : 0 - 100
Default : 50

In *Fast mode*, this is the *overall* sharpness amount. In *Advanced mode*, the *flat* area sharpness amount.

Edge

Values : 0 - 100
Default : 50

Advanced mode only

Edge sharpening amount

Texture

Values : 0 - 100
Default : 100

Advanced mode only

Balances flat area texture and sharpening noise.

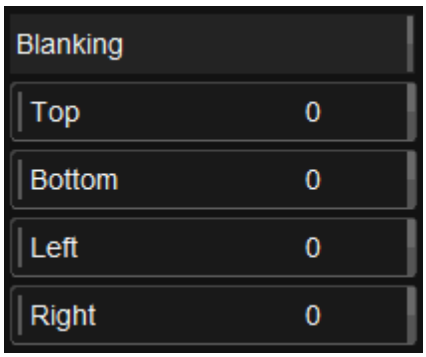
Recommended settings are 100 for normal images and 0 for graphics. If flat area noise is intrusive a setting lower than 100 will give less noise at the expense of texture definition.

Deinterlace Control

In an analogue video signal there may be a visible *half lines* (unless removed when captured) i.e. half the line is blanked and the rest of the line contains image information. The last half line is usually unwanted when de-interlacing.

To remove the blanked part, enable *Half Line Fix* and select the line(s) to address for top (*Top Fix Lines*) and bottom (Bottom Fix Lines). This will ensure that the blanked part of the line is not visible in the final image.

Blanking



Blanking controls can be used to cover up soft image edges or any other edge related problem.

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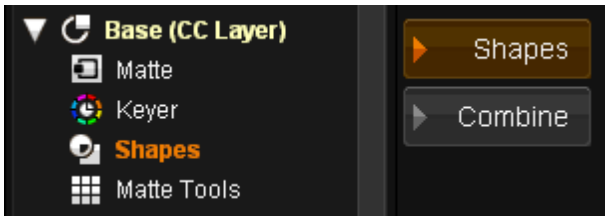
Shapes

2014.1

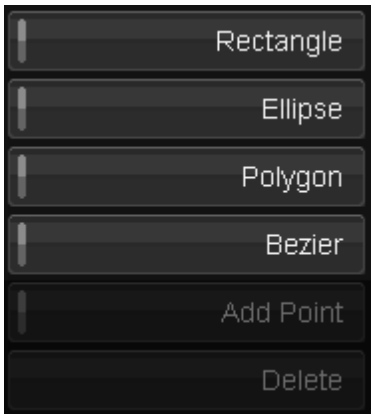
Shapes 19



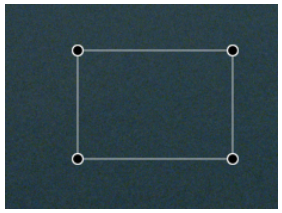
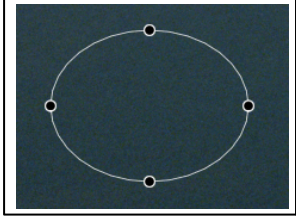
You can use an unlimited number of editable shapes for isolation (mattes) or as an effect themselves.

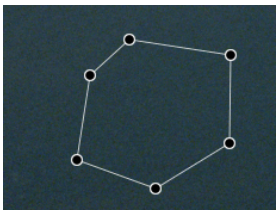
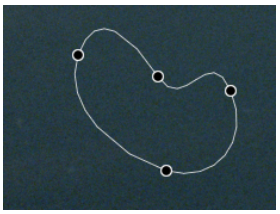
Shapes are available as separate (user) effects, as part of an *Effect Layer* and as part of any *Colour Correction Layer* (CC Layer).

Available Shapes



There are four basic shapes available :

	 Four points define rectangle. User clicks and drags to set dimensions. Points are not bezier spline style.
	 Four points define ellipse. User clicks and drags to set dimensions. Points are bezier spline style.

	Polygon User clicks to add points (minimum three) and define shape. Straight edges define shape. Points are not bezier spline style.
	Bezier User clicks to add points (minimum three) and define shape. Points are bezier spline style.

Valhall Control Panel

You can add a shape using the *Control Panel* using the *Image* Panel {Iso} menu, and pressing the corresponding shape button e.g. {Ellip} :

You can also use the *Image Panel Quick Shape* buttons above the trackball (mouse) :

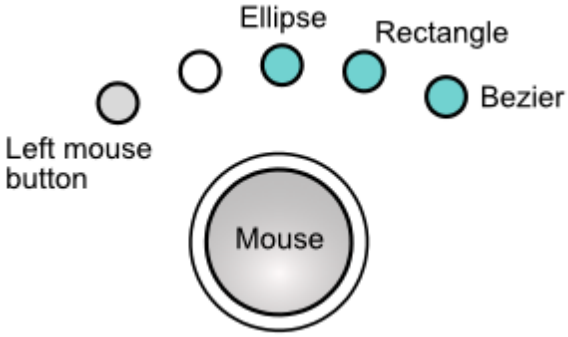


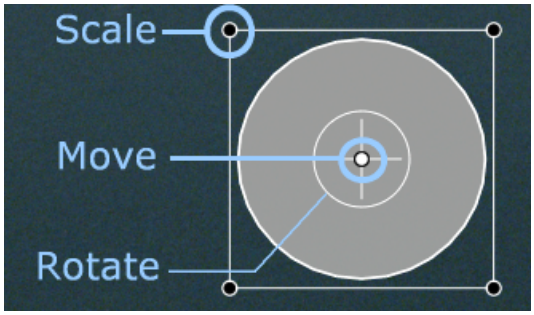
Image Panel

The ESC key on the keyboard **closes** a *polygon* and *bezier* shape.

Transforming Shapes

You can move, scale and rotate a shape via the *Transform* button.

When the *Transform* button is enabled, the shape is displayed with **transform controls** :



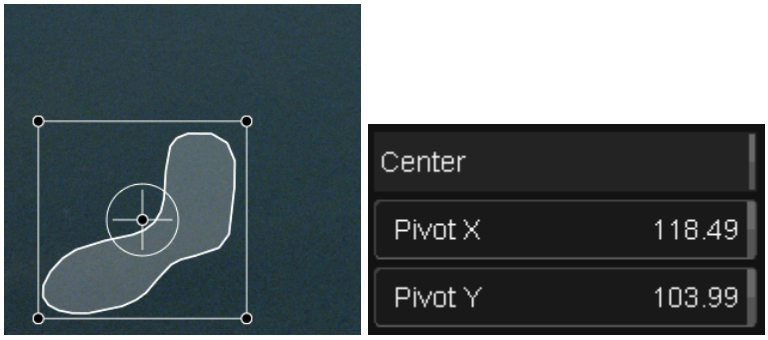
Transform controls on shape.

You can use your mouse to scale, move or rotate the shape by dragging an overlay element on-screen interactively.

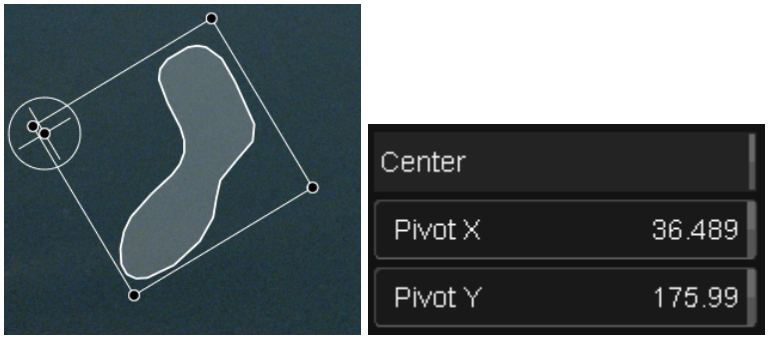
You can perform the same transformations by using your mouse to modify the *Position*, *Scale* and *Rotation* parameters directly via their sliders :

Pivot Points

The *Pivot X/Y* points define the center of the shape for scaling and rotation. Initially, the pivot points are placed in the exact center of the shape :

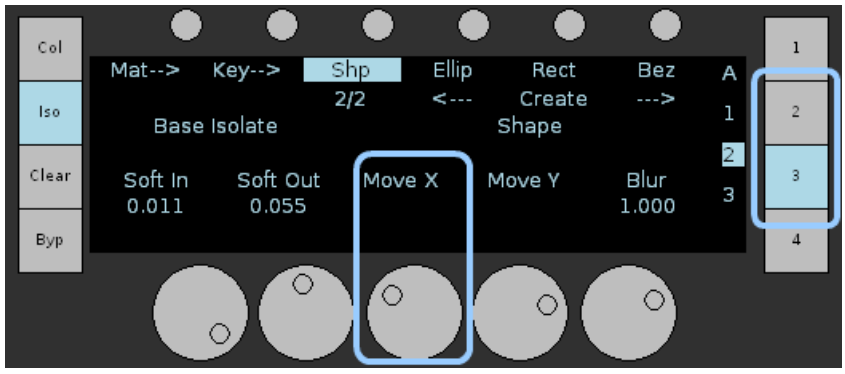


You can move the pivot location using the GUI sliders or dragging with the mouse. The shape will rotate around the pivot :



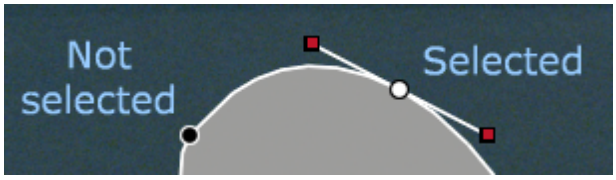
Valhall Control Panel

On the *Valhall Panel*, you can manipulate and transform shapes (move, rotate, scale etc.) using the *Image* panel {ISO} menu on button {2} and {3} e.g.



Manipulating Shapes

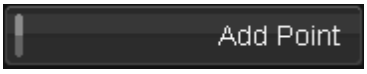
Shapes are defined by **control points**. A point is *selected* when it **filled** (white) i.e.



- To select multiple points, use **CTRL + Click**
- To de-select a point, **CTRL + Click** it again
- To de-select all points, click outside the shape

You should be in *Shape* mode (not *Transform* mode).

Adding Points



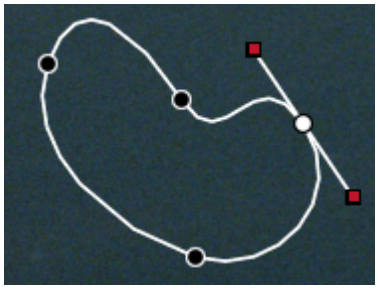
To add a point to a shape, enable the *Add Point* button and click on the shape edge.

Points added behave as *bezier* points for all base shape types.

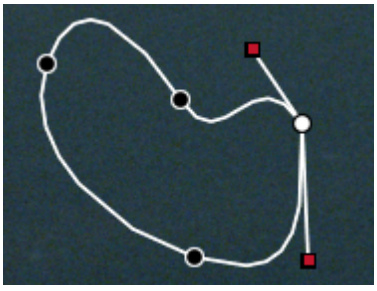
Bezier Control

A bezier shape is a *spline* and is defined by a number of bezier control points.

Each control point has *tangent handles* on each side of the point that allow fine control of the curve of the shape at the point.



Shape showing bezier-style control point and tangent handles.

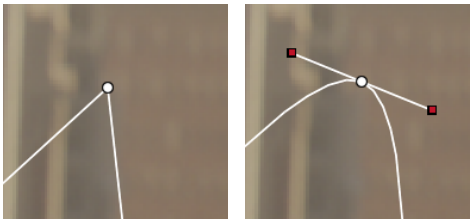


One tangent handle "broken" (not mirror of other) using **SHIFT+CTRL** drag handle.

The basic ellipse and bezier shapes are defined by *bezier* style points whereas the basic rectangle and polygon shapes are defined by standard non-bezier points. Any points *manually added* to any shape will be a bezier type.

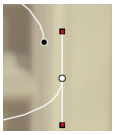
You can access and pull out the *tangent handles* on a **sharp cornered** bezier shape by dragging the corner point while holding down the keyboard **z** key :

Keyboard : z + drag (mouse)



Breaking a Shape

You can *break* a corner of a shape by holding down the keyboard **SHIFT + CTRL** keys while dragging the point.

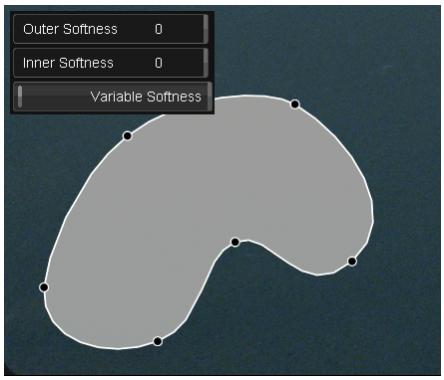


To **re-join** the two points, hold down **SHIFT+CTRL** and drag one point on top of the other. The two points should *snap* together when close.

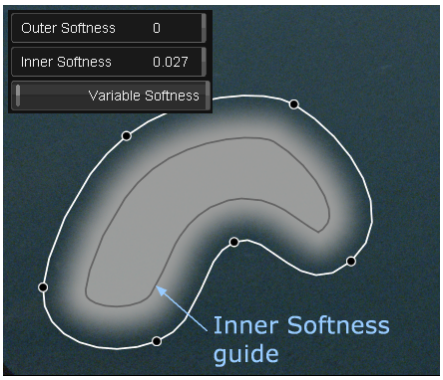
Shape Softness

Shape softness controls are as follows :

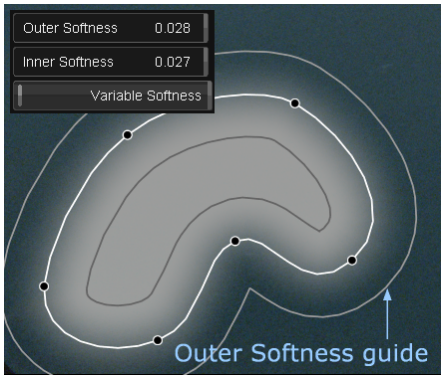
- *Outer Softness* sets the amount of softness to create inside the shape boundary edge.
- *Inner Softness* sets the amount of softness to create outside the shape boundary edge.
- The *Variable Softness* button lets you vary the amount of softness created for different parts of the shape.



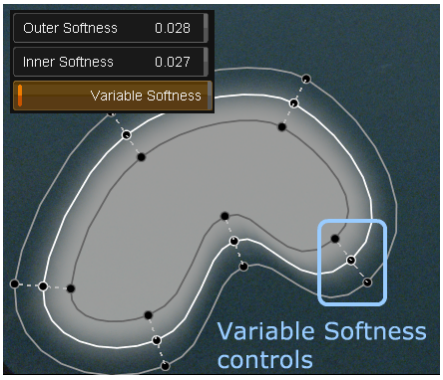
Basic bezier shape



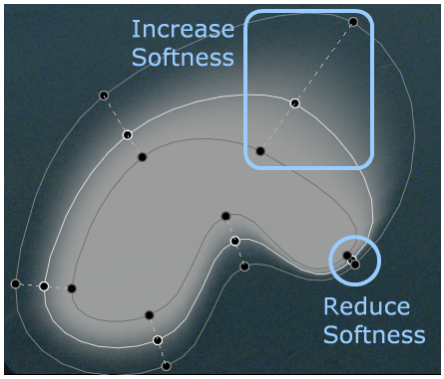
Increase Inner Softness



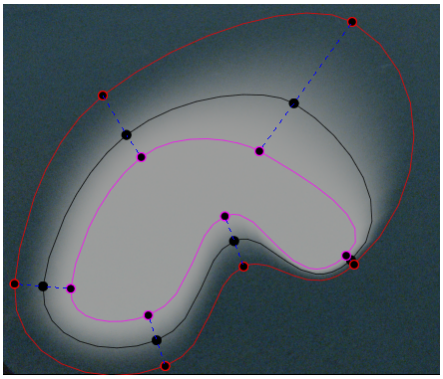
Increase Inner and Outer Softness



Enable Variable Softness



Vary the softness by manipulating the variable softness controls



If viewing shape is difficult - Press the keyboard "p" key to change the shape colour

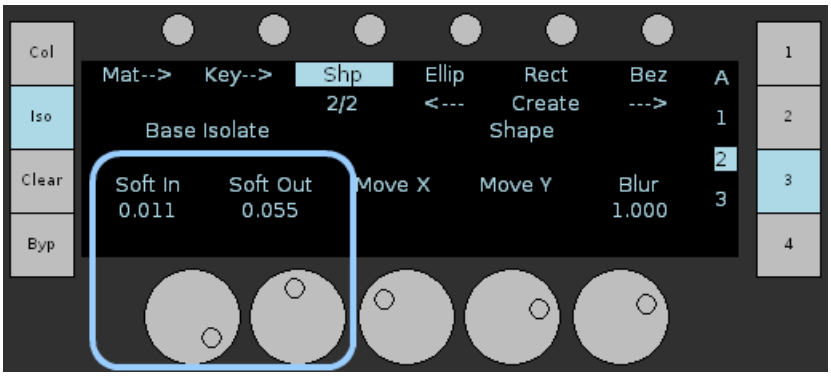
You may get unwanted artifacts if points and/or handles overlap or cross.

Del Outer / Del Inner

- Del Outer will **reset** any outside/outer softness variation change
- Del Inner **resets** any inside/inner softness variation change

Valhall Control Panel

On the *Valhall Panel*, you can manipulate *Inner* and *Outer Softness* using the *Image* panel {ISO} menu on button {3} e.g.



Shape Overlay Colour

The shape overlay colours are defined in the *Shapes* section of the file :

`C:\Nucoda\2014_1\root\colour.prefs`

Two sets of colours are defined : a *normal* and an *alternative* set of colours.

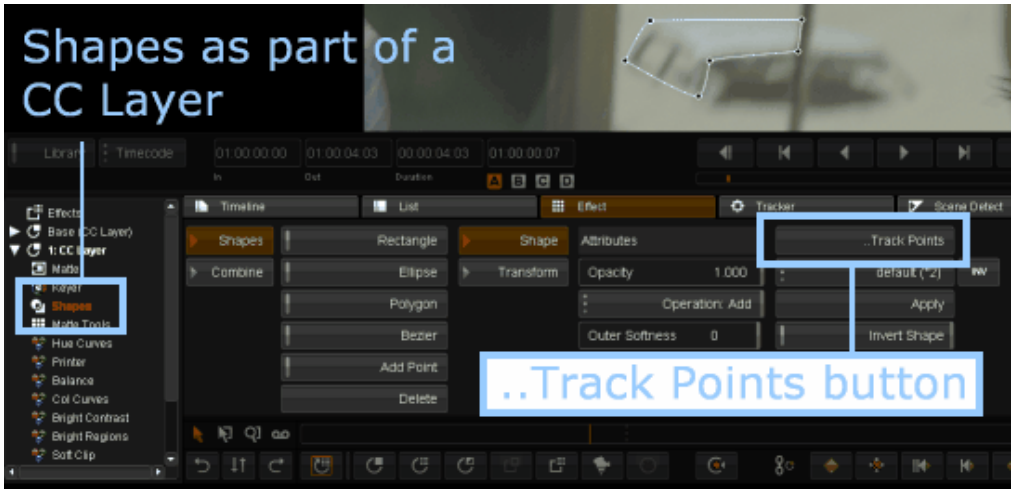
The alternative set are tagged with **Alt**. You can switch between the normal and alternative colours dynamically by pressing the keyboard **p** key.

Example

```
Shapes
{
    Outline          255 255 255 255
    Outer            155 155 155 155
    Inner            100 100 100 100
    VariableLink     185 185 185 185
    OutlineAlt       0 0 0 255
    OuterAlt         255 0 0 255
    InnerAlt         255 0 255 255
    VariableLinkAlt  0 0 255 255
}
```

Be careful editing this file and always create a backup first.

Tracking Shapes



You can attach tracking information to shapes via the ***..Track Points*** button.

DVO Tracker

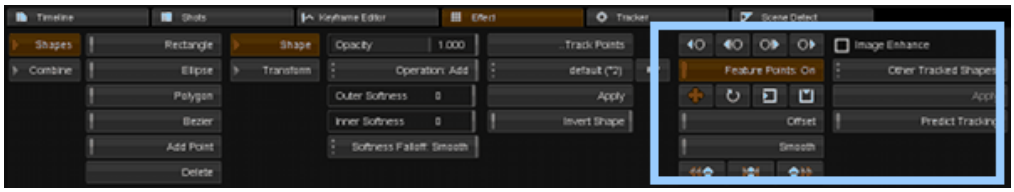
20

2014.1

DVO Tracker 20

Version 2009 introduces a sophisticated new tracker called the *DVO Tracker*. The tracker automates the selection of optimal tracking points within a user specified area of a shot.

The *DVO Tracking* controls are available inside every *Shapes* layer and become active when a shape is **selected**.



DVO Tracker controls inside a Shapes control pane.

Tracking Basics

Any *Shapes* layer inside a *CC Layer* (including *Base*) or *FX Layer* can be used to create a track for a shot.

Before starting, **familiarise yourself** with the shot you wish to use. Play the shot through and identify the area you wish to track and its behaviour. Pay attention to how the chosen feature moves (including any scaling or rotation), whether it is ever obscured (or partly obscured), whether it stays inside the frame and how other parts of the shot move relative to it.

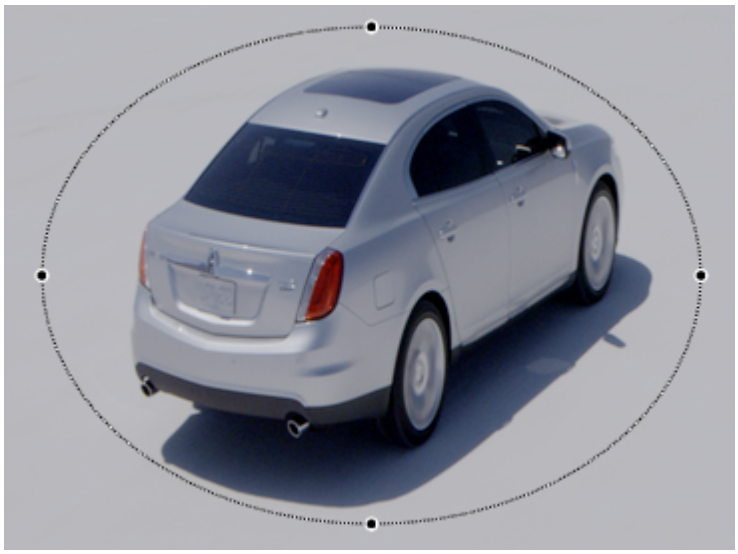
The tracking process is straightforward :

- Draw a shape around the area you want to track (and affect)
- Press the track control to track forwards or backwards

With the play-head at the required starting frame, we will draw a shape around the feature we wish to track.

In the *Shapes/Shape* menu :

We draw our shape around the feature we wish to track :



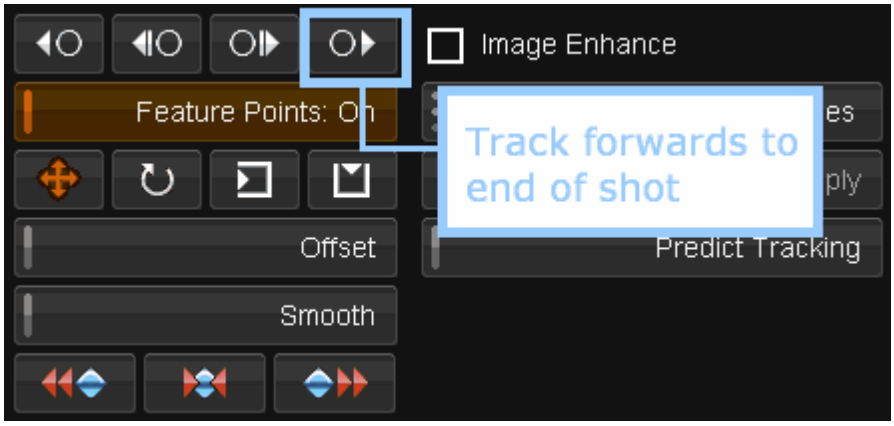
Ellipse shape drawn around our car "feature" we will track

Shape Tips

It is often possible to keep the shape simple (rectangle, ellipse). Any matte/mask the track creates will usually be softened such that it properly merges into our shot and does not stand out in an artificial way.

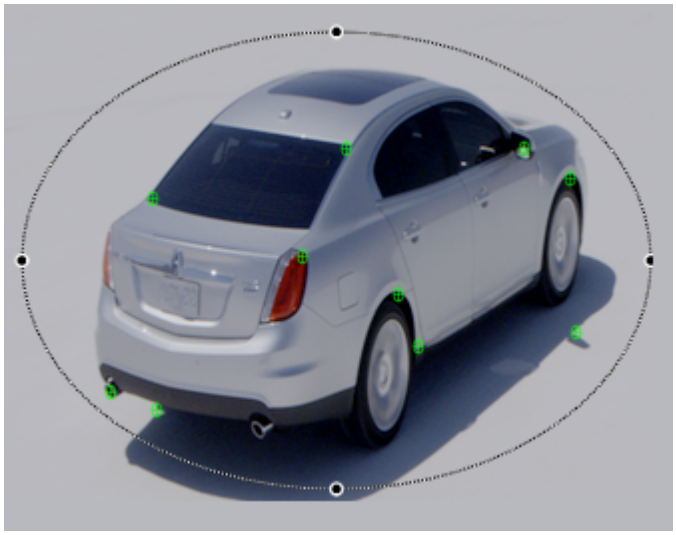
Create the shape to cover the entire feature area of interest with some head-room. Try and extend the shape a bit beyond the feature area.

Once the shape is drawn, the *DVO Tracking* controls are enabled.



To track the feature forwards to the end of the shot, press the track forwards button (as shown above).

If the Feature Points button is enabled, two or more feature points will appear inside the shape as we start playing the shot, tracking as we go.



Tracking forwards, feature points used appear in green.

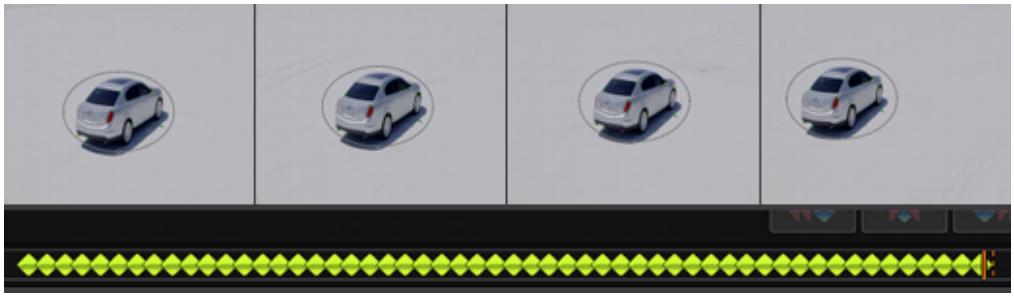
While tracking is in progress, the shape is drawn with a **thick** border. Once tracking is complete (or stopped), the shape reverts to its normal outline.

If the shape turns **red**, feature points can not be matched in this frame. In the first instance, let the tracker continue because it will attempt to match new points.

If this continues to fail :

- Turn on *Image Enhance* and retry.
- Redesign or edit your shape to find better feature patterns

The selected feature tracks until the end of the shot and then stops. The tracking creates a new key-frame for each frame ,displayed in the key-frame box at the bottom of the screen.



A key-frame is created for each frame of the shot we track.

We can now use this tracked shape as a mask.

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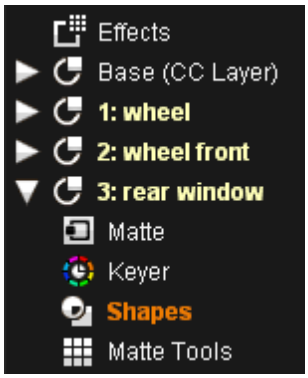
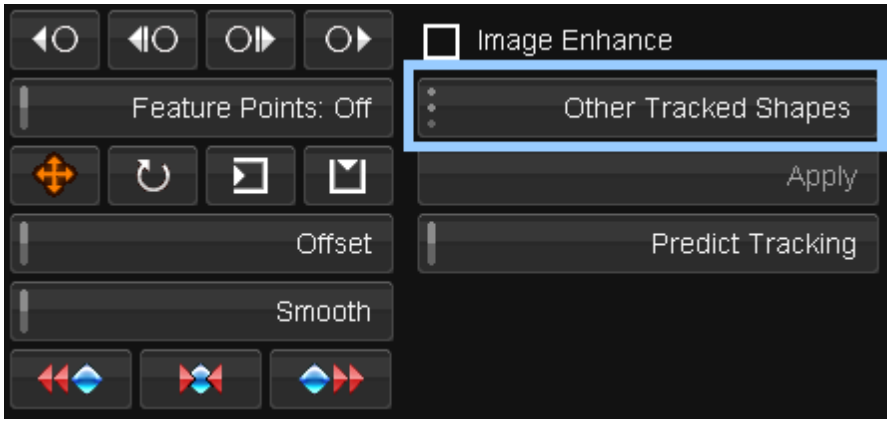
Using Other Tracks

One shot may have any number of effect layers, each including a *Shapes* layer.

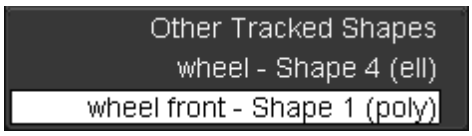


CC Layers 1-2 all contain tracked shapes. Layer 3 (rear window) is new.

The tracking data from any previously tracked shape can be selected and applied to any other shape via the *Other Tracked Shapes* drop-down list :



Having created a new shape, select *Other Tracked Shapes* and choose the tracking data you want to apply :

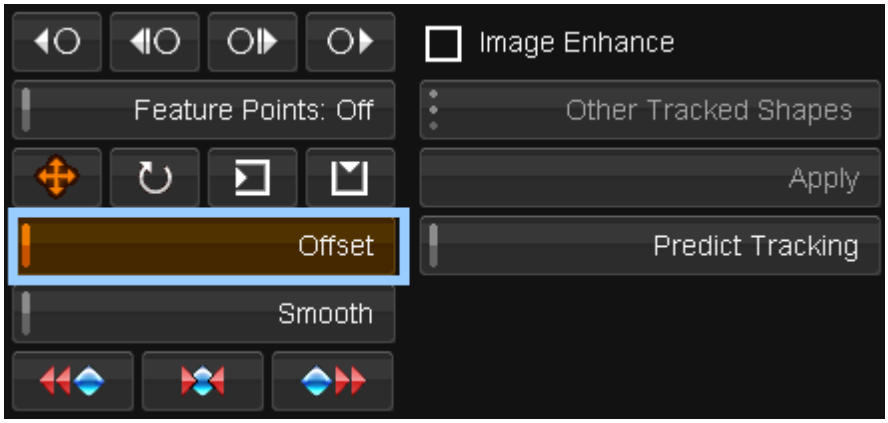


Once chosen, click the *Apply* button to apply the tracking data to your shape.

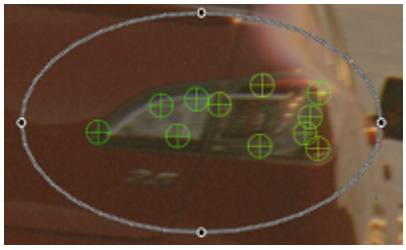
The tracking data is applied and track/shape key-frames appear in the key-frame bar at the bottom of the screen. If the shape had any previous tracking data, it will be **overwritten**.

Offset Tracking

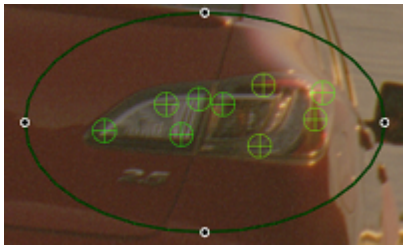
Offset Tracking lets you use a different area of a shot for generating the track compared to the position of the shape itself. If a different area of the shot becomes the best candidate for generating the actual tracking data, we can use it by creating an offset shape and positioning it over this better area.



Enabling the *Offset* button will activate a **copy** of the tracking shape :



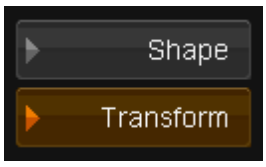
Normal shape tracking



Offset enabled - shape copied (green)

The copy is **green**. Initially, it is placed on top of the original shape.

We can switch to the *Transform* menu :



Then move the offset shape to our new preferred position :

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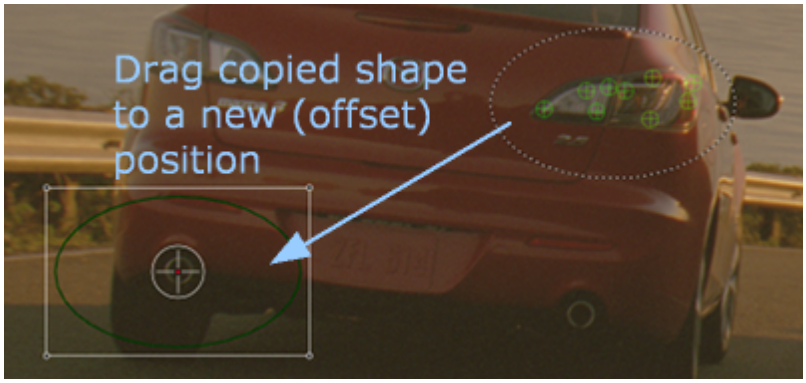
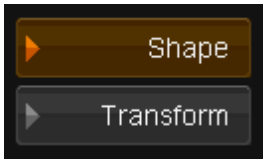


Once in place, we can switch back to the *Shape* menu :



and continue our tracking.

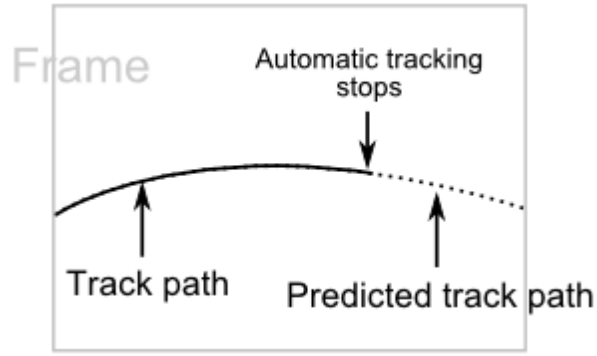
The tracking data is calculated from the offset shape and applied to the original.

When the *Offset* button is enabled, the offset shape is used to generate the track. You can set the offset shape to any suitable position in the frame. If a better position becomes apparent, you can re-position it again.

For an offset shape track calculation to work properly, both the original and the offset shape need to share the same type of motion.

Predictive Tracking

Normally, if the tracking calculation fails at some point in a shot, tracking stops. In some cases, it is apparent that the track path could simply carry on as before, the path being extrapolated based on its previous history.



If tracking fails because our tracked feature loses definition or goes out of camera, we can enable *Predict Tracking* at this point.

When we resume tracking, the track path is calculated such that it smoothly continues along the same path as calculated previously.

1: Tracking ...

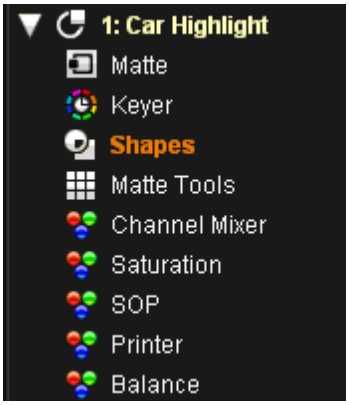
2: Feature reaches edge of frame. Turn Predict Tracking ON.

3: Feature off camera but track path is extrapolated.

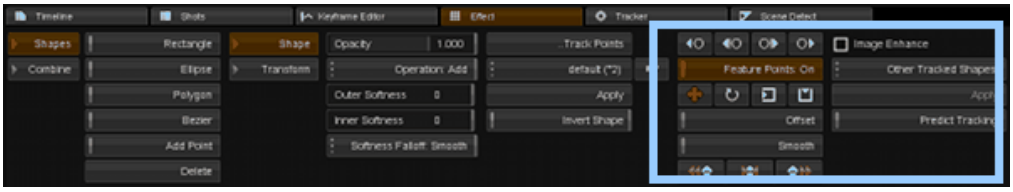
Track path extrapolation continues.

Reference

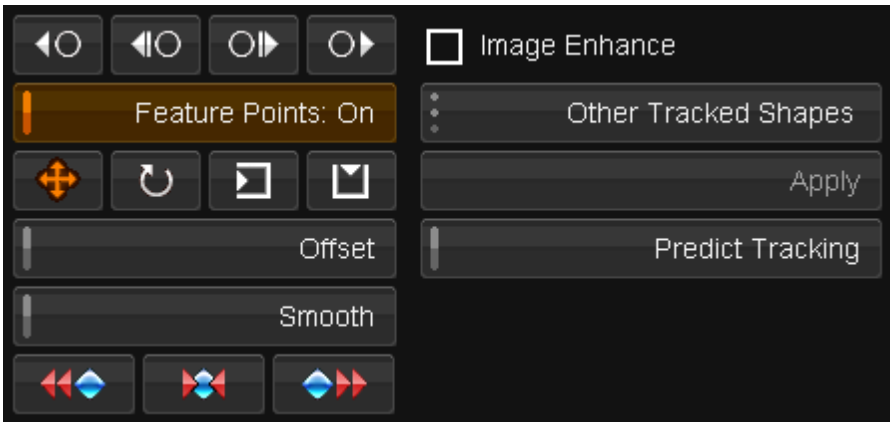
The *DVO Tracker* is available to use everywhere we have a *Shapes* layer available. As such, we can draw a shape to define the feature we wish to track and use the result as a *Region of Interest* matte.



Every *Shapes* parameter pane includes the new *DVO Tracker* control parameters as shown in the figures below. The *DVO Tracker* controls become available once a shape is drawn.



Shape controls and new DVO Tracker controls highlighted



Track Buttons

These buttons start the tracking process. You can track forwards or backwards in a shot, to the shot end or start (respectively) or a frame at a time.

From left to right we have :

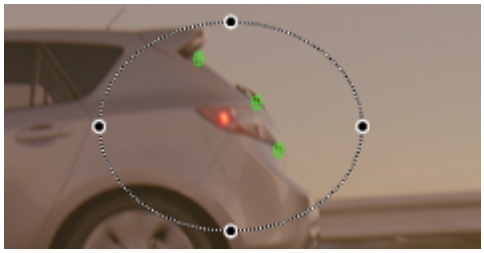
	Track backwards from current frame to start of shot.

	Track backwards one frame from current frame.
	Track forwards one frame from current frame.
	Track forwards from current frame to end of shot.

Feature Points

The *Feature Points* button toggles display of the **feature points** used by the *DVO Tracker* at each frame.

Feature Points are points inside our shape that are calculated to be good patterns to use when tracking. They are chosen *automatically* and appear inside the shape we have defined.



Feature Points in green, found inside the defined shape.

Feature Points are chosen dynamically on a frame by frame basis. They are not user selectable or editable.

Transform Buttons

These buttons control what *transformations* are applied to the shape as we track. If the button is off (white), the selected transformation is not applied.

If no transform buttons are enabled, the defined shape will not move or change at all because no transformations will be applied.

From left to right we have :

	Pan X/Y Enable to calculate X/Y (up/down/left/right)

	pans.
	Rotation Enable to calculate feature rotation.
	Scale X Enable to calculate scale changes in the X-axis.
	Scale Y Enable to calculate scale changes in the Y-axis.

Offset Button

The *Offset* button creates an *offset* shape from the currently selected shape.

This offset shape can be moved (offset) to a new position in the shot from where new feature points are calculated. The feature points calculated using the offset shape are applied to the original shape. You can re-position an offset shape any number of times in the same shot if required, with any tracking data calculated applied to the original shape. See Offset Tracking.

Smooth Button

Normally, the *DVO Tracker* will position the transformed shape (x/y,rotation, scale) in single pixel increments. The *Smooth* button will enable **sub-pixel positioning**, and cause the track to be re-computed.

This smoothing effect will be visible by switching to the *Keyframe Editor* tab and viewing the resultant animation graph.

If you turn the *Smooth* button off **before completion**, the smooth process will stop and any smoothing done will be *reset* to its previous state. Once complete, an *undo* operation will also reset the *entire* track path to its pre-smoothed state.

Reset Track Points

These buttons allow you to reset all or some of the key-frames created by the tracking process.

From left to right we have :

	Reset all track key-frames from current position to start of shot.
	Reset all track key-frames.
	Reset all track key-frames from current position to end of shot.

The tracker key-frames are shown below the *Shapes* panel as *green* diamonds :

Key-frames shown in green, and current key-frame in blue.

Pressing the reset all left button will result in all key-frames to to the left of the play-head being reset (*inclusively*). This results in the following key-frame status :

Key-frames after reset all left button pressed.

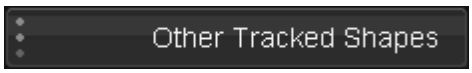
Image Enhance

Image Enhance will do some image processing on the shot to increase the contrast such that tracking is optimised and a more accurate track calculated. This enhancement is transparent and done in the background (with no visible image changes).

Enabling *Image Enhance* may be necessary for certain type of media, particularly those with lower contrast or high contrast changes.

> *Image Enhance* will default to **on** for *Log* projects.

Other Shapes



This drop-down list lets you apply the tracking data from a previously tracked shape in the shot (in another layer) to the current shape. See Using Other Tracks.

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Predict Tracking

The *Predict Tracking* toggle button lets you carry on the track even if all tracked feature points have moved outside the image frame and tracking has terminated. Turning *Predict Tracking* on will **extrapolate** the track to the end (or start) of the shot such that the track is contiguous and smoothly extended. See Predictive Tracking.

Valhall Keys

Mod	Key	function
Shift	▶	Track forwards to end of shot
Shift	◀	Track backwards to start of shot
Shift	▮▶	Track forwards one frame
Shift	◀▮	Track backwards one frame
Shift	▲ ▼	Scroll up/down "Other Tracked Shapes" menu
Shift	Enter	Apply tracking from selected "Other" shape to current shape.
	Enter	Creates or toggles the *Offset Shape*
Delete	▶▮	Resets tracking from current frame to end of shot (inclusive)
Delete	▮◀	Resets tracking from current frame to start of shot (inclusive)
Delete	■	Resets all tracking on current shot

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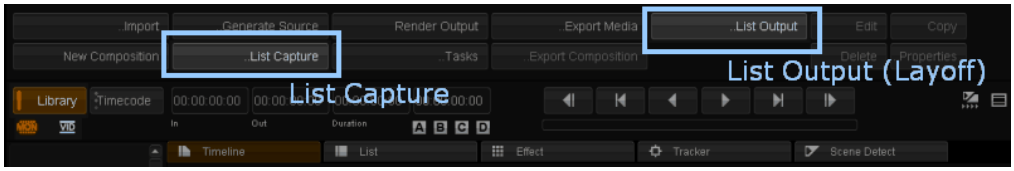
Video I/O

Video I/O 21

You can capture and lay off video via the Library modules :

Capture video ..List Capture

Layoff video ..List Output



These options will only be enabled when your system has a video I/O board installed.

Audio I/O

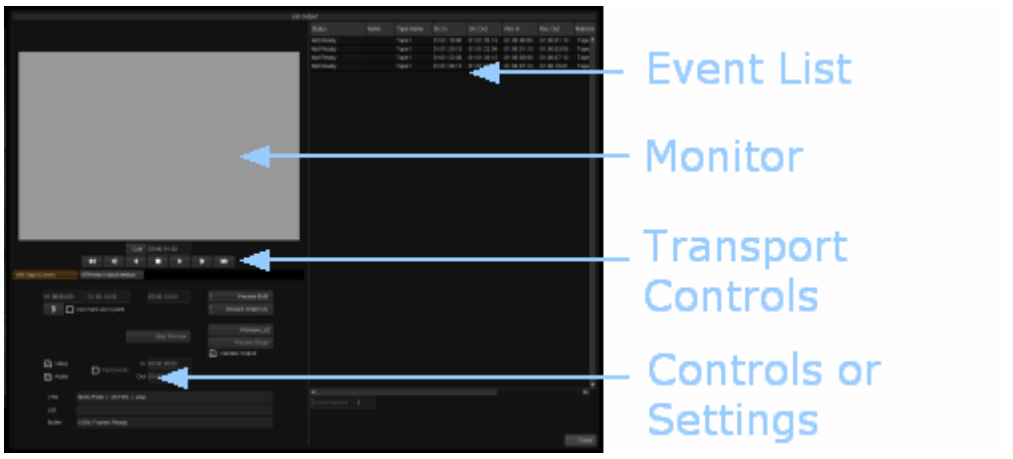
Support for 8 channel audio capture and layoff with the following video cards :

- *Bluefish Lust* - AES/EBU audio
- *DVS Centaurus2* - AES/EBU *and* embedded audio

Video I/O

Capture and layoff modules have similar layouts :

- The monitor and transport controls are situated on the top left
- The settings and control tabs sit below the monitor and transport controls
- The event list and event controls are on the right hand side



Playback/Transport Controls

The playback controls on a VTR deck are more commonly referred to as *transport* controls. These controls are the same on both the capture and layoff screens:

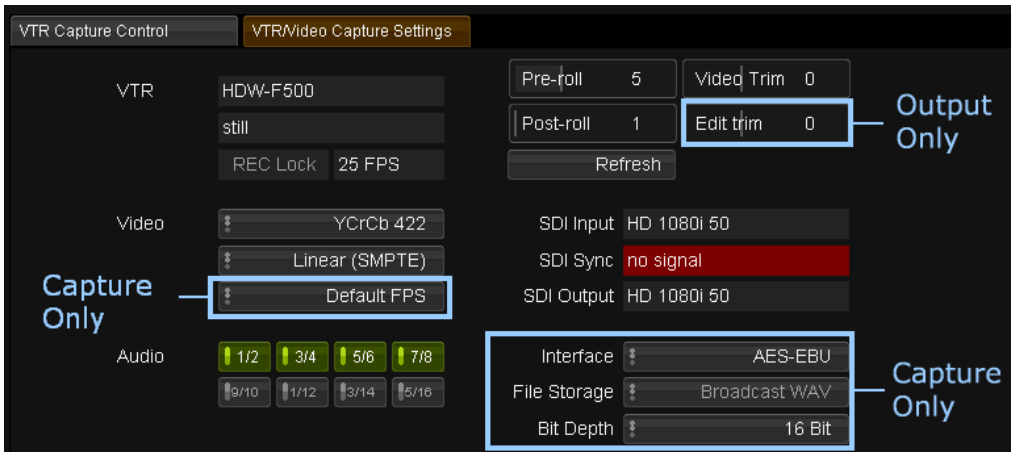
Timecode Box / Cue

This field displays the current tape position.

If you enter a timecode in the box and press the *Cue* button, the tape will cue to this location.

VTR Settings

The ***VTR/Video Capture Settings*** tab contains a variety of configuration settings - including VTR status, video format used, and audio channels active. The available settings are similar between the capture and layoff modules.



> **!** Always check these settings carefully before proceeding with any video I/O.

VTR Deck Status Feedback

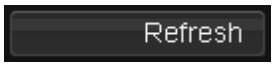
The four deck status fields are read-only display fields and provide feedback on :

- Model of VTR attached (e.g. HDW-F500)
- Status of the VTR (still,stop,play etc.)
- Reported VTR frame rate
- Record *inhibit* status (REC Lock).

Note - if the deck and project frame rates do not match you will get a warning message.

This message can be turned off by setting the *general.prefs* `frameRateWarning` parameter to false.

Refresh Button



The status fields should update automatically but you can perform a manual update by pressing the *Refresh* button.

Video Signal Feedback

The three 'SDI' fields are read-only display fields, providing feedback from the video card.

SDI Input

This shows the video format (resolution and frequency) of the video *input* signal.

SDI Sync

This shows the reported *sync* signal seen by the video card.

SDI Output

This shows the video format (resolution and frequency) of the video *output* signal

Video Format settings

capture

output

Colour Space control

The first drop-down button allows you to set the colour space mode for your material.

- YCrCb 422
- RGB 444

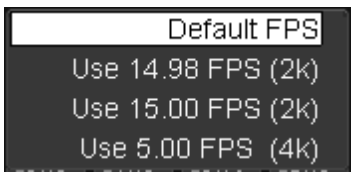
RGB Scaling control

The second drop-down allows you to set the video scaling mode that the application should apply to the material:

- Linear (SMPTE) - no scaling
- Linear (CGR) - signal is scaled

This setting is very important in order to ensure that what you see on your monitor is what you will get on output. For a discussion of *Colour Scaling* modes, see the *Setup Manual*.

FPS control



VTR Capture only.

For certain bandwidth intensive formats we need to specify an optimal capture rate to use.

- Default FPS - the default is the composition frame rate
- Use 14.98 FPS (2K)
- Use 15.00 FPS (2K)

- Use 5.00 FPS (4K)

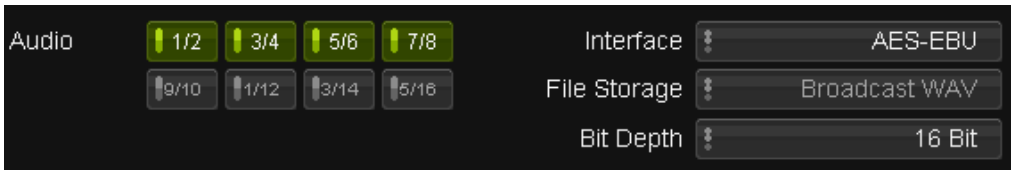
Blanking

VTR Output only

This setting will blank out the top and bottom video lines.

This may be useful to hide any edge artifacts pushed into the video active area by certain effects (e.g. blurs).

Audio I/O



Note - the audio settings on the right are only available in the Capture module.

The audio channel buttons give feedback and also act as controls. They will automatically default to show how many audio channels are available (highlighting them in green), after which you can enable/disable them for capture/layoff.

2014.1 currently supports **eight** (8) channels of audio. The buttons for channels 9-16 are visible but disabled (and not used).

Capture Only

Interface

Options : AES-EBU or Embedded SDI

This sets the source of the captured audio data.

We support AES/EBU audio with the *Bluefish Lust* card (AES audio cables)
We support AES/EBU *and* embedded audio on the *DVS Centaurus2* card.

The audio capture path is set separately in the capture *Controls* tab.

File Storage

Options : Broadcast WAV

Bit Depth

Options : 16 or 32

Number of bits per sample to capture.

Roll and Trim controls

Pre-roll

How many seconds the deck should allow the tape to roll before capture/layoff starts.

When capturing or laying off the deck will cue to the VTR in point minus the value set in the pre-roll field. No actual capture/layoff takes place during a post-roll.

Post-roll

How many seconds the deck should allow the tape to roll for after capture/ layoff ends. No actual capture/layoff takes place during a post-roll.

Video Trim

This numeric entry field / slider allows you to correct timecode offset errors that might occur when capturing or laying off video.

The *Video Trim* controls which frame of video is recorded at the edit (in) point and can be used to help fix video routing or system delays.

Edit Trim

VTR Output module only.

Similar to video trim, it allows you to correct any timecode errors causing the recorded material on tape to be starting at the wrong timecode.

The difference between video trim and edit trim is that the video trim setting will make adjustments to the time when the frames start being sent from disk to tape, i.e. when layoff starts, whilst the edit trim setting makes adjustments to when the deck actually starts recording.

The point at which the deck actually starts recording prior to receiving the video is what can be adjusted using the edit trim control, should you find that the layoff is not ending up at the correct timecode.

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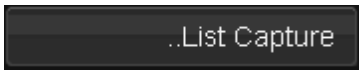
Project Settings for Video Output

If you intend to lay off video from your project, make sure you enable the Video Output setting on the project output format. See Cache Output.

Video Capture

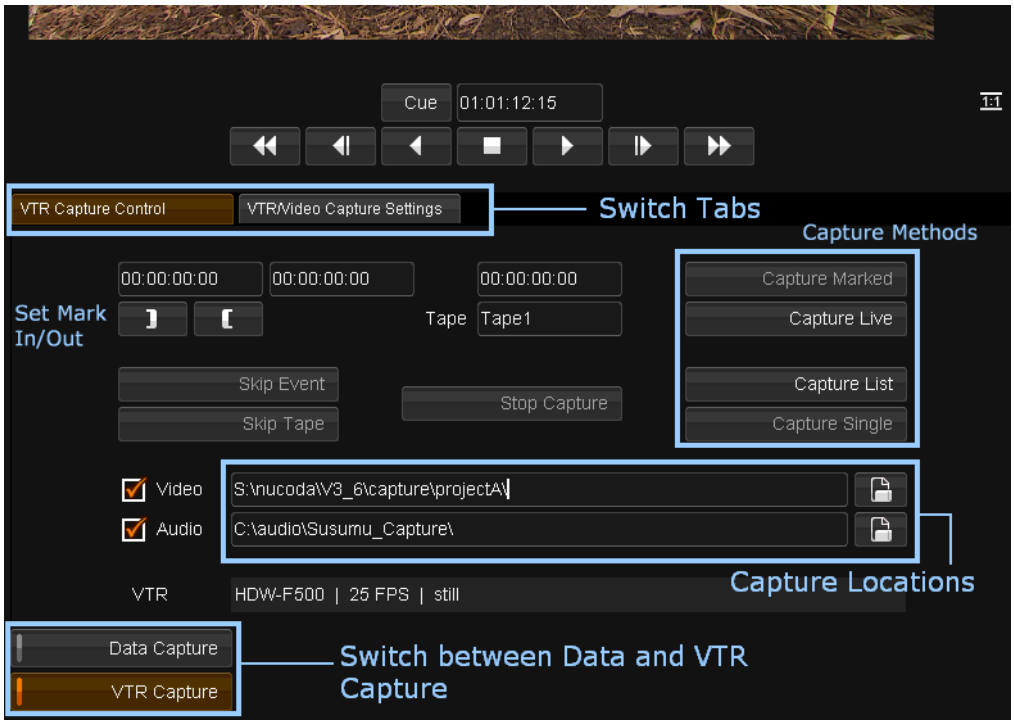


The *VTR Capture screen* is accessible from the *library screen* via the ***..List Capture*** button.

This brings up the *list capture screen*, with two options on the bottom left:

- *Data Capture* - this is the mode used for batch capturing digital media .
- *VTR Capture* - this is the mode for capturing media from tape.

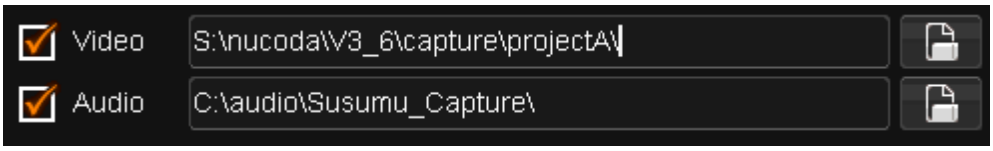
For capturing from a VTR deck, press the ***VTR Capture*** button.



The *Control* tab is where the interactive controls for carrying out a video capture are located.

Prior to attempting any capture you should always review and adjust all the values in the settings tab as appropriate for your material and composition.

Capture Locations



Defaults : As per *general.prefs* preference file.

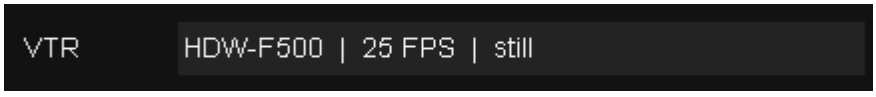
Use the tick boxes to choose which data streams to capture - video, audio or both.

The capture paths are shown and can be edited in place, or set via the file browser (click the icon).

If you change a path here, the new location will be saved to the *general.prefs* preference file.

For optimal performance, the audio and video capture locations should be set to separate disk volumes in order to optimise concurrent disk-writes (and minimise interference). For example, capture video to the S:\ volume and audio to the W:\ volume.

Deck Status



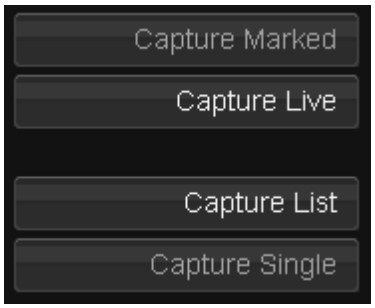
The deck status is displayed in a summary line at the bottom of the controls tab.

Information displayed is :

- VTR/deck model,
- Frame rate
- Control status.

If the VTR deck is *record inhibited*, this will be shown as *REC Lock*.

Capture Methods

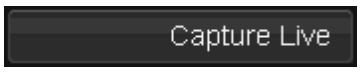


There are three main methods for performing a video capture:

- *Capture Marked* - specify an in and an out point, then capture this marked region.
- *Capture Live* - start recording as the VTR plays
- *Capture List* - import and then capture from a list (e.g. an EDL).

The *Capture Single* operation is discussed as part of the Capture List section.

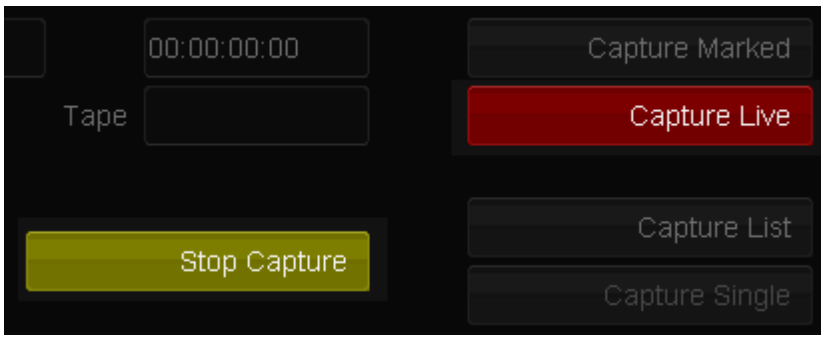
Capture Live



This is the simplest capture method and involves pressing the ***Capture Live*** button at an appropriate time as the video tape is playing.

Pre-roll and post-roll settings do not apply during live capture.

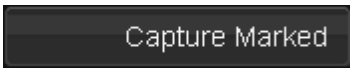
When ***Capture Live*** is pressed, it turns red and the ***Stop Capture*** button is highlighted. To stop capturing, press the ***Stop Capture*** button.



If you do a 'Capture Live' without having pressed play, i.e. with no footage being displayed in the viewer, you will capture blank (black) frames for the duration of the capture.

Once capture has stopped, the captured footage will automatically be added to your project library.

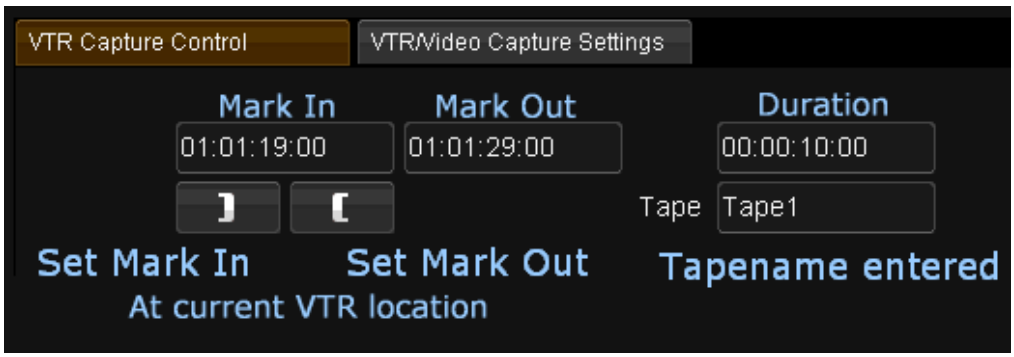
Capture Marked



This capture method will capture the footage defined between the marked in and marked out timecodes.

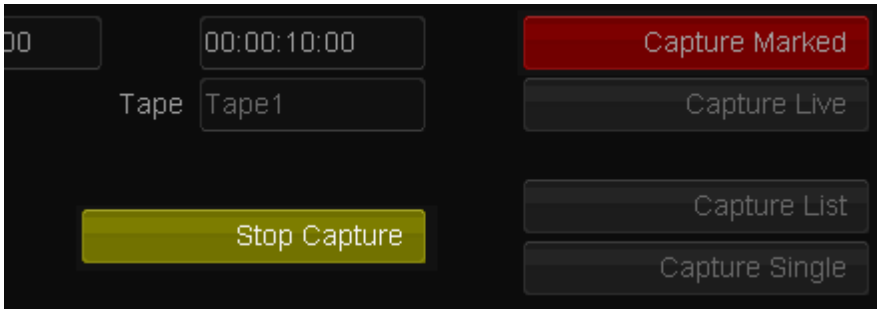
Specify the *Mark In* and *Out* points by :

- Manually typing in the in and out timecode into the appropriate in/out timecode box or
- Cueing the VTR deck to the In timecode and pressing the *Mark In* button, then
- Cueing the VTR deck to the Out timecode and pressing the *Mark Out* button



For accurate marking of the In/Out points you can use the *jog frame* buttons to locate the exact frame positions.

Once marked, the duration display field will show the total duration of the marked region, and pressing ***Capture Marked*** will begin the capture.



During capture, the Capture marked button will turn red and the VTR deck will cue to the pre-roll point before the marked timecode in-point.

Once the mark-in position is reached the capture will commence and at this point the ***Stop Capture*** button will become enabled.

Once complete, the capture will stop automatically. You can interrupt the capture at any time by pressing the ***Stop Capture*** button.

Once capture has stopped, the captured footage will automatically be added to your project library.

Capture List

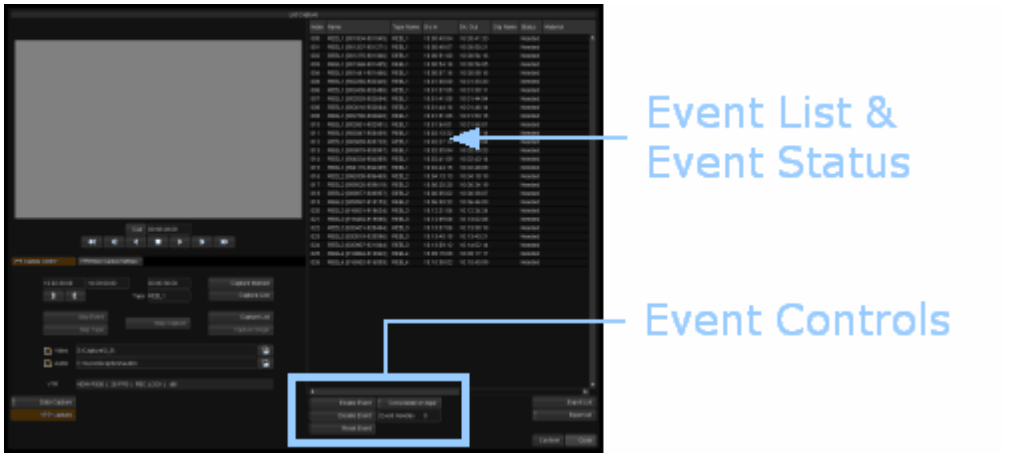
The ***Capture List*** method requires an existing event list.

This list is usually created by importing a list file (such as an EDL) and then capturing and conforming the events. Refer to the section on importing list files for detailed instructions on creating a composition based on a list file.

Once you have imported the list file, the corresponding composition will appear in the *Library* and the events that need to be captured will appear on the timeline.

> No media will exist in the library until it is captured and conformed to this empty timeline.

Inside the capture module, the list events are shown on the right.

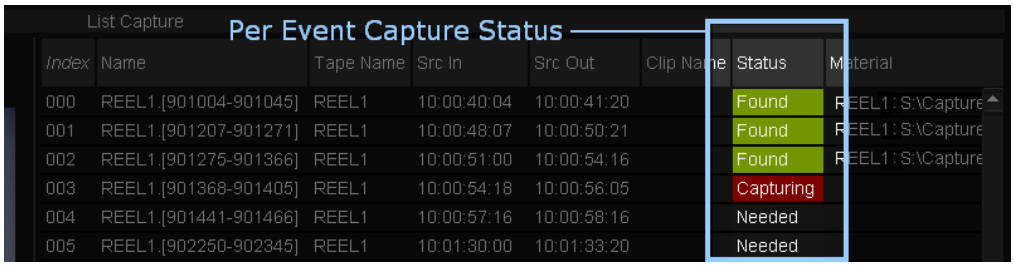


Event List

The event list table is composed of a number of fields per event.

> The *Event List* is displayed a standard table. For more detail on tables and their use, see the Tables section.

Each event listed has a *status* assigned to it. This status will update as the capture proceeds.



Event Status

The status fields are :

- *Needed* - the media for this event has not yet been captured and the event is enabled for capture.
- *Disabled (Needed)* - the media has not yet been captured but you have disabled the capture of this event.
- *Disabled (Found)* - the media has already been captured and you have disabled the event to avoid recapturing it.
- *Capturing* - the media for this event is in the process of being captured.
- *Partial Capture* - part of the media for this event has been captured but not in its entirety.
- *Found* - all the media for this event has been found and captured.

Material

Once an event has been captured (*Found*), the path to the stored media will be shown in the *Material* column for that event.

Tape Name

Events in the list may need to be captured from *different* tapes, as indicated by the *Tape Name* column. You will be prompted to insert each tape (or to skip it).

This will continue until all the media from the different tapes has been captured.

> If you press ***Skip Tape***, no media will be captured for this tape and capture will proceed to the next tape (prompt for insert), if there is one. You can capture any skipped tapes later.

Event Controls

The *event controls*, located beneath the *event list*, allow you to refine your list and select specific events prior to capturing:

Enable / Disable Event

To selectively choose to capture events (or not), select single or multiple events from the list and use the ***Enable Event*** and ***Disable Event*** buttons prior to pressing ***Capture List***.

A disabled event will have a status that displays *Disabled* e.g. *Disabled (Needed)* or *Disabled (Found)*.

> You can capture events in "groups", perhaps using a different number of *handles* for each.

Reset Event

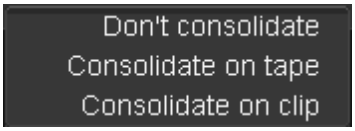
This option will reset the selected event(s) to the status of *Needed*, whether or not the media had already been captured. This allows a re-capture of a previously captured event.

Event Handles

This numeric slider specifies whether to capture more frames than the events require i.e. *handles*. Setting the *Event Handles* to 5, will capture 5 frames of head and 5 frames of tail for each enabled event.

The addition of handles might be applied in order to capture as much of each media clip as might be later needed and to allow later trimming of the media clip within the composition. Adding handles can also be used to lengthen events in the composition list so that their timecodes overlap with others and various events can be consolidated and captured as a single media clip using the 'Consolidate Events and Tapes' function.

Consolidation



Default : Consolidate on tape

Consolidation is the grouping together of overlapping events (generally by timecode) into a single "event" which can be processed (captured) as one. This can minimise the amount of work required to capture the same amount of material. Consolidation reduces the total number of events to capture.

Don't consolidate	Ignore potential consolidation and show every event in the list.
Consolidate on tape	Consolidate overlapping timecodes within the same tape.
Consolidate on clip	Consolidate overlapping timecodes within the same clip.

You can also use *consolidate* in conjunction with the *handles* function to increase the length of media required by events that are close in their timecodes but not overlapping. By making them overlap on purpose, the source material can be captured in one go as a single clip.

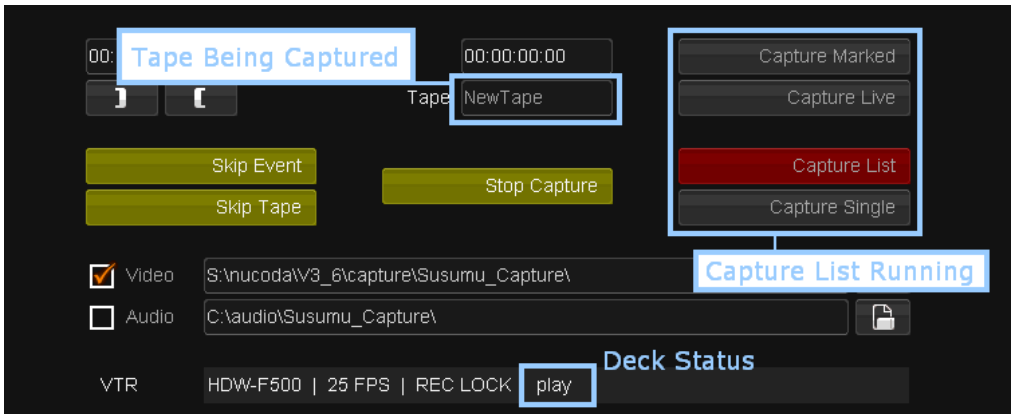
Capturing the List

When ready, press ***Capture List*** to start the capture.

Once capture starts, the ***Capture List*** button turns red.

Buttons ***Skip Event***, ***Skip Tape*** and ***Stop Capture*** are also enabled now.

> In-between capturing each event, whilst the deck scans to find the correct position, these interactive buttons will become disabled.



Once capture is complete (or stopped), you should look at the status of each event in your list to check that it was captured correctly and that the *Material* location is given.

Press ***Conform*** to complete the capture process and link the captured media in the library to your composition.

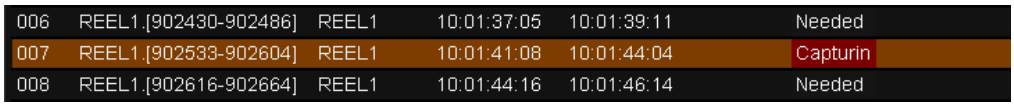
Capturing a Single Event

To capture a single event, select it in the event list and press ***Capture Single***.

> This button is only enabled when a single event is selected.

As before, the button will turn red once capture is underway, and the '***Stop Capture***' button will become enabled:

The event list will show the individual event being captured:



Exporting the Events List

Press ***Export List*** to export all, or a subset, of the event list.

You can export as a CMX3600 EDL or a CUT style list.

There are three options for export :

- *Export all* - This will export the full list of events as displayed on-screen. You may want to do this if you've altered the original list in some way, e.g. by adding handles or using the consolidate events function.
- *Export found* - This will export a list containing only the events that you captured.
- *Export not found* - This will export a list of all the events that were not captured. This could serve as an easy way to identify which events have yet to be captured.

The list export option is only available in the *List Capture screen.*

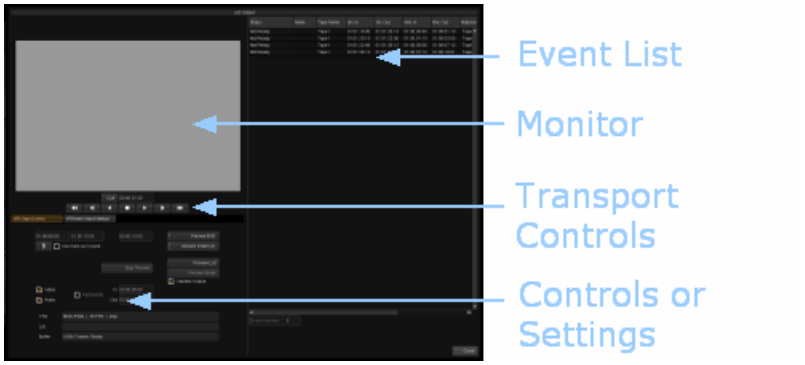
Video Layoff

The *VTR Layoff screen* is accessible from the *library screen* via the **..List Output** button. The layoff module is called *List Output* and will output the current composition events to video.

There are two tabs - *VTR Output Control* and *VTR/Video Output Settings*. The *Settings* tab has been detailed in the VTR Settings section.

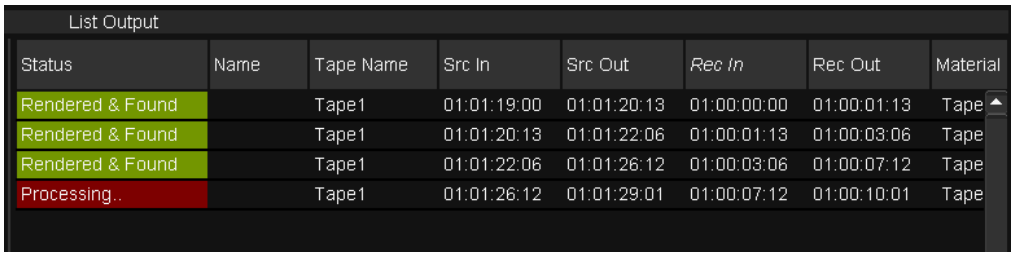
The *monitor* will switch between displaying the footage on tape during tape playback, and displaying your composition footage during the actual layoff process.

The *Control* tab is where the interactive controls for carrying out a video layoff are located.



Event List

The events to be output are shown on the right-hand side and correspond to the events on your timeline. The number of events in the list matches the number of events on your timeline. Gaps in the timeline are ignored.



Though gaps in the timeline do not show up in the event list, they will in fact be laid off to tape as black frames for the duration that they occur on the timeline.

Status

Before output, each event is checked and **rendered** if necessary. This is an automatic process.

- *Processing* - This means the event is still being checked or rendered.
- *Rendered & Found* - This means the event is ready for layoff.

Rec In / Rec Out

The *Record In* time of the first event matches the start time of the composition on the timeline, and the *Record Out* time of the last event matches the end time of the composition.

These two columns show the *Record In* and *Record Out* timecodes of the event as it appears on the composition timeline. These values are used when laying events off in *Record Order*.

Src In / Src Out

These two columns show the *Source In* and *Source Out* timecodes of the source material for that event. These values are used when laying events off

in *Source Order*.

Material

This column shows the location of the rendered material on disk. This may or may not correspond to the location of the source material shown in the *library screen*.

Tape Name

This column shows the tape name corresponding to the source material for that event.

Event Handles

If a **source order** mode (e.g. *Source Order Tape*) is selected, the *Event Handles* option is enabled.

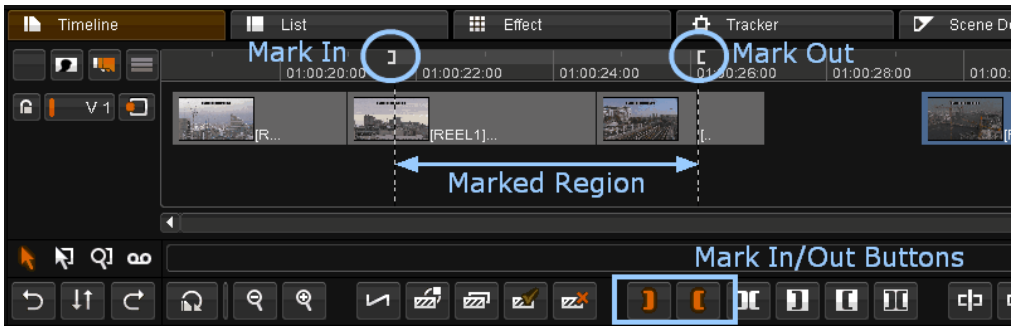
This numeric slider is located directly below the *event list*, and allows the option of laying-off more frames than each event requires (i.e. adding 'handles'). The handles are added on either side of the event on tape.

> The addition of handles might be applied in order to layoff as much of each media clip as might be later needed when re-importing the media as source material for a composition, and to allow later trimming of the media clip within the composition.

Laying off Sections

With no marks set, the Output module will select all events for layoff.

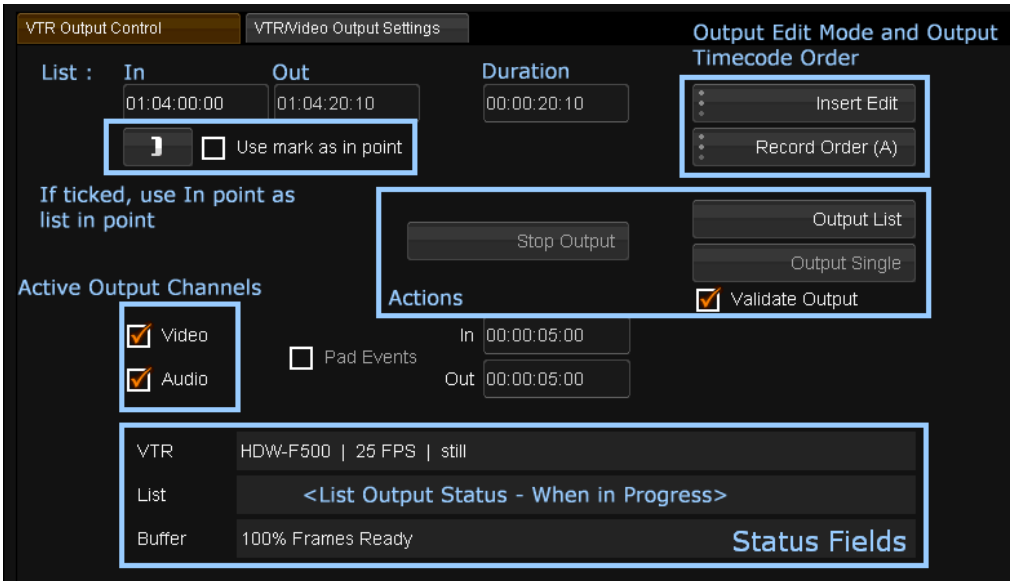
To layoff a **section** of your timeline only, use the timeline *Mark In* and *Mark Out* buttons to mark the desired range before pressing ***..List Output***.



The output module will only display and output the marked events.

Output Controls

The VTR Output Controls are shown below.



The *Actions* buttons in the centre perform the specified output operation e.g. ***Output List***, ***Stop Output*** etc.

Status Fields

VTR

VTR Deck status is shown in the *VTR* row.

If the tape is **record inhibited**, it will show *REC Lock*.

List

During processing or output, this row will show the list status and output progress.

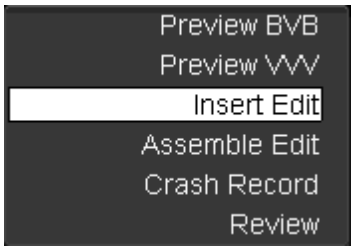
Buffer

The Buffer row will display how many frames are buffered and ready for output.

Output Channels

Use the tick boxes to choose which data streams to output - video, audio or both.

Record Edit Mode



This drop-down list allows you to select the edit mode, which determines how material is written to tape. The following modes are available.

Insert Edit	Each event is recorded at the record in-point timecode. This mode requires a tape pre-striped with the right record timecodes.
Assemble Edit	This locates the record in-point timecode of the first event and starts recording. From here, timecodes are generated (assembled) as the output proceeds. Only the initial in-point timecode is required (hence only a partially striped tape is necessary).
Crash Record	This method starts recording at the current tape position, with no pre-roll or post-roll used, and writes out timecodes as it records. This mode will therefore work on a blank tape (no pre-striping required) and is only suitable for laying off contiguous material. The *Pad Events* option is available here.
Preview BVB	This mode previews the output. It does not write anything to tape. The preview shows : Black - Output Video - Black.
Preview VVV	This mode previews the output. It does not write anything to tape. The preview shows : Video - Output Video - Video.
Review	This mode reviews the output on tape. It does not write anything to the tape.

Pre-striped tapes must be striped at the same frame rate as your composition.

The *Actions* buttons will change depending on record mode selected.

Timecode Output Order

This drop-down list allows you to select which timecode order is to be used when writing the events to the tape:

Source Order TC (C)	Record each event to tape at its *original* location (i. e. its ***source*** timecode), ignoring its location on the composition timeline (*record* timecode). **Event handles :** enabled.
Source Order Tape (C)	This is the same as *Source Order TC* except the list is sorted by *tape* first, then source timecode. **Event handles :** enabled.
Record Order (A)	Record each event to tape at its composition (record) timecode location i.e. the same sequential order as your composition timeline and at the same timecodes (unless *"Use mark as in point"* is set, see below). **Event handles :** disabled.

Event Handles are enabled for *Source Order* mode layoffs :

Note that *Source Order* layoffs will **not render** *transition* effects.

When *Source Order* is selected, the *Mark-In/Out* values in the *Event List* will change to show the *source timecodes* matching the start and end timecodes of the list events. When *Record Order* is selected the *record timecodes* are shown instead.

Pad Events In / Out

Crash Record only.

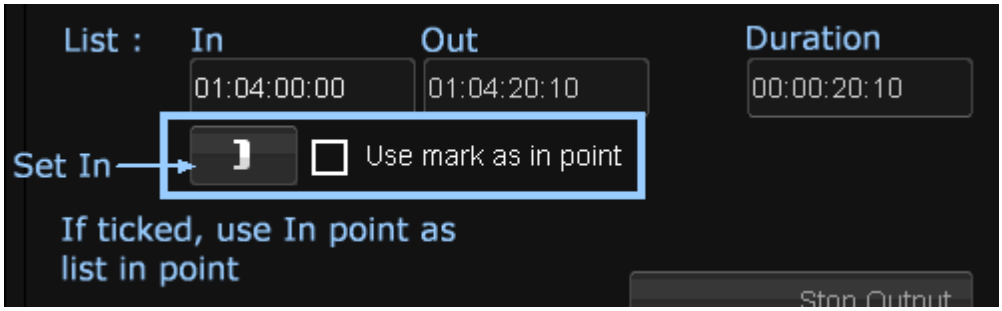
Pad Events controls whether *padding* is to be applied during output. Padding consists of black frames with contiguous timecode being written before and after the events being laid off.

How much padding is written is controlled by the *In* and *Out* timecode fields.

> The timecode given to the padding will always precede the timecode of the 1st event being laid off, and if a Mark-In Timecode has been supplied the timecode of the padding will precede the Mark-In TC.

Padding can only be carried out in *Crash Record* mode.

In / Out Markers



The *In*, *Out* and *Duration* boxes relate to the *in*, *out* and *duration* times of your event list. *Record* timecodes or *source* timecodes are used according to the *Timecode Output Order* selected.

You can set the *In* point timecode by :

- Pressing the *Set In* button (*Cue In*). This sets the *In* timecode to the current deck position.
- Erasing and typing in a new timecode via your keyboard.

Use mark as in point

Ticking this box will set your **layoff in-point** to the *In* timecode set. Your list will be recorded starting at this *In* timecode

Output List

This button is enabled when there are events in the *event list*. Pressing it will start off the layoff to tape of all the events in the list.

> Unlike the *VTR Capture* module, you cannot select a group of events for layoff from the event list. All items in the list will be output. To select a sub-section for layoff, see Laying Off Sections.

Output Single

This button is enabled whenever a single event is selected/highlighted in the *event list*. Pressing it will layoff that specific event only.

Stop Output

This button is only enabled when there a layoff is in progress. Pressing it will halt the layoff.

Output List

Output List will layoff the entire event list.

Checking the List

Before the list is output to video, the events are first checked to ensure they are fully rendered and available.

Validate Output

Default : On

If Validate Output is enabled, a final output validity check is performed after any rendering is complete.

Once layoff starts, the button will turn red and the ***Stop Output*** button will become enabled and turn green.

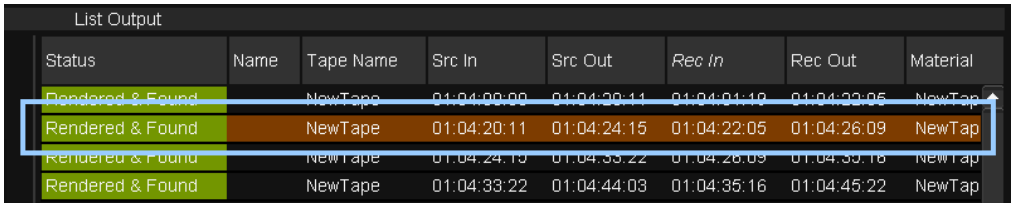
The tape will be scanned for the correct timecode in-point and recording will commence. For a crash record, recording will commence at the tape position.

> All the events shown in the event list will be written to tape.

The layoff can be halted at any time by pressing the ***Stop Output*** button.

Output Single

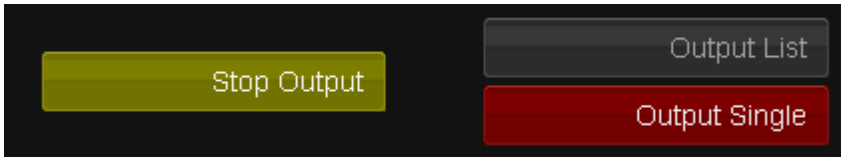
Output Single will layoff a **single selected event** only.



> The Output Single button is only enabled when a single event is selected in the event list.

Before the layoff starts, the event is rendered (if required) and a final output validation check is performed (if Validate Output is enabled - see Validate Output).

Once layoff starts, the button will turn red and the ***Stop Output*** button will become enabled and turn green.



The tape will be scanned for the correct timecode in-point and recording will commence. For a crash record, recording will commence at the tape position.

Only the selected event will be output to tape.

The layoff can be halted at any time by pressing the ***Stop Output*** button.

Avid Integration

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Avid Integration 22

Digital Vision products include extensive support for interoperability with Avid products, including :

- *Avid Media Composer*
- *Avid Symphony*
- *Avid DS*

This chapter describes the main workflows available for Nucoda systems when working alongside an Avid.

Tested and qualified versions of Avid applications are listed in the Compatibility section, alongside a list of supported formats and effects.

Process

The workflow process involves two or three steps, depending on your choice of workflow.

Step 1 : AAF to Nucoda

The first step is to transfer the AAF composition from the Avid :

- **Export an AAF composition** from an Avid and import it into a Nucoda.

  We will detail the various options, settings and things to look out for in this process. See AAF to Nucoda.

Step 2

Grade and /or restore on the Nucoda. Finish on Nucoda and play out to server or tape

or

Step 3

Export the source modified AAF from Nucoda and re-import into Avid, or export graded MXF files from Nucoda, and re-link them to a copy of the original sequence in Avid.

The Nucoda can also be used for final finishing and output.

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There are four main ways of transferring the material back to the Avid for finishing :

- Sending an Edit Modified **AAF** back to the Avid. (Sources in the AAF are updated to point to new graded media)
  See : Edit modified AAF Back to Avid

  > Note that the *Edit Modified AAF back to the Avid* route is only available for Nucoda compositions **originally created from imported AAF files**.

- Sending only **MXF media** back to the Avid.
  See : MXF Back to Avid

- Sending an **AAF** containing a record order sequence back to the Avid and optionally doing an **Interplay** *check-in of the sequence and the new video media.*
  See : Record AAF Back to Avid with Interplay

  > Note that the *Record AAF back to the Avid* route is only available for Nucoda compositions **originally created from imported AAF files**.

- Sending an Record order **AAF** back to the Avid for use in MC or manual check in into Interplay.
  See : Nucoda Exports Record Order AAF

Compatibility & Features

The following Avid product versions are tested and qualified :

- Avid Media Composer **5.0.x / 5.5.x / 6.0**
- Avid Symphony **5.0.X / 5.5.x / 6.0**
- Avid DS **10.3 / 10.5**

Avid Effect Support

For the level of Avid effect support, see the Avid Effects chapter.

MXF and Codec Compatibility

See the Nucoda Forum for PDF files with supported MXF and codec formats.

Avid Audio Support

Tracks in the Avid must be Mono and audio must be 48000 / 16Bit PCM (MXF)
This option should used for adding mixed audio tracks to MXF exports.

When a new AAF is created on export, the audio information will be passed through to the new AAF.

Version 2011.2 introduced the ability to import audio from AAF files and play them back on Nucoda.

Create AAF Option for Record Order Export

If a sequence was imported from AAF for grading, there is now an option to create an AAF file on export in *Record Order TC*.
This will create a single MXF file with an AAF containing *references* to the video and any audio files as a sequence.

Loading this AAF into the Media Composer will load the new sequence.

Automatic Interplay Check-In

When using the create AAF option above, an additional option for *Interplay Check-In* becomes available. If the *Interplay* settings in the general.prefs file is correctly configured, the resulting AAF will be checked into *Interplay* automatically in the defined project.

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AAF to Nucoda

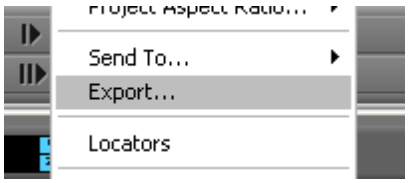
This chapter describes how to *export* an AAF from the Avid system and import it into the Nucoda.

This is the common starting point for each workflow we discuss.

- The Avid exports an AAF
- The Nucoda system imports this AAF for grading.

Export AAF from Avid

To export as AAF from the Avid, right-click your sequence and choose *Export...* :

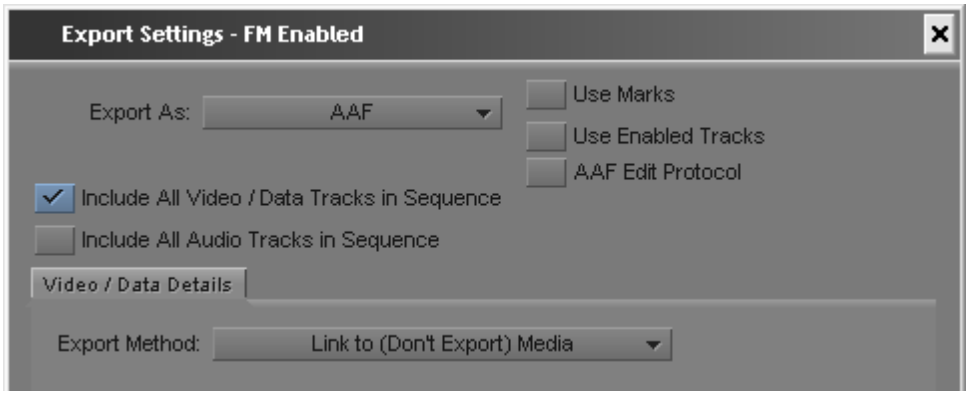


Export Settings

At the bottom of the export dialog box, the selected *Export Setting* and *Options* button allow you to define an export *preset*.

Here we have an AAF export preset defined called *FM Enabled* :

Use the *Options...* button to view the settings :



If you are planning to export audio with your AAF, we recommend mixed down mono tracks. PCM (MXF) 48KHz 16bit audio.

Export As :	**AAF**
Use Marks :	**Useful when only exporting specific areas of the timeline.**
Use Enabled tracks :	**Useful when exporting Audio as Mixdown tracks and ignoring other audio tracks.**
AAF Edit Protocol :	**Will allow for export of AMA linked media (caution)**
Export Method :	**Link to (Don't Export) Media (Audio and Video)**

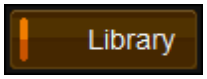
The *Export Settings* option *Render Video Effects* forces the Avid to render everything currently un-rendered.

For more information on this option, see : Avid Effects.

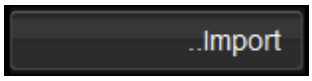
Navigate to the desired folder and enter a file name for your AAF. Then press *Save* :

Import AAF on Nucoda

On the Nucoda, switch to the *Library* view to import the AAF file :

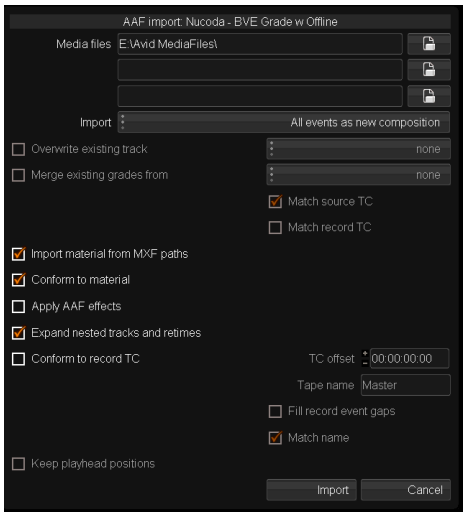


Then press the *Import* button :



Navigate to the folder containing the previously saved Avid AAF file and press the *..Import* button.

An *AAF Import* options window opens and lets you set various options used for the import and initial processing of the AAF file.

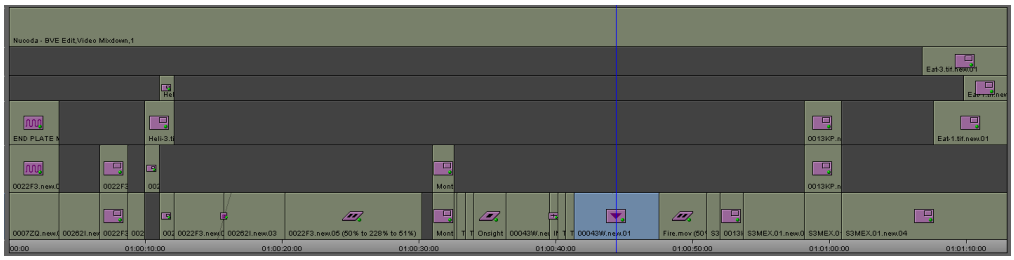


See the Nucoda AAF Import Options section for a full description of the available settings.

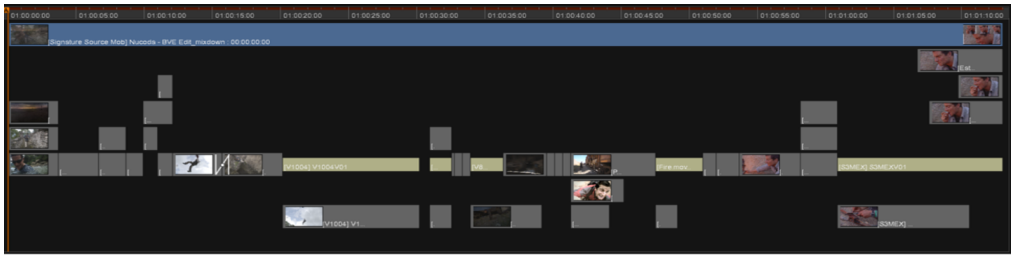
We import the AAF and use settings :

- *All events as a new composition*
- *Import material from MXF paths*
- *Conform to Material*
- *Expand nested tracks and retimes*

The AAF file creates a Nucoda timeline which we can then start working on.



Avid timeline



Nucoda timeline

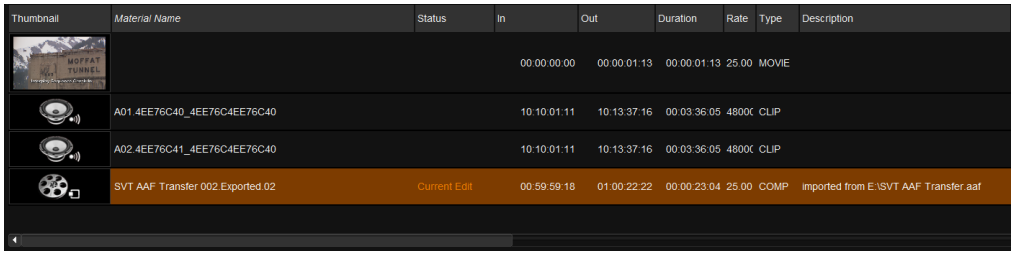
If **updated** AAF compositions become available, the Nucoda can import them and **merge** them into any active timeline.

When we have completed our work, we can proceed as follows :

- Finish on the Nucoda.
- Finish on the Avid and proceed to one of the work flow options outlined next.

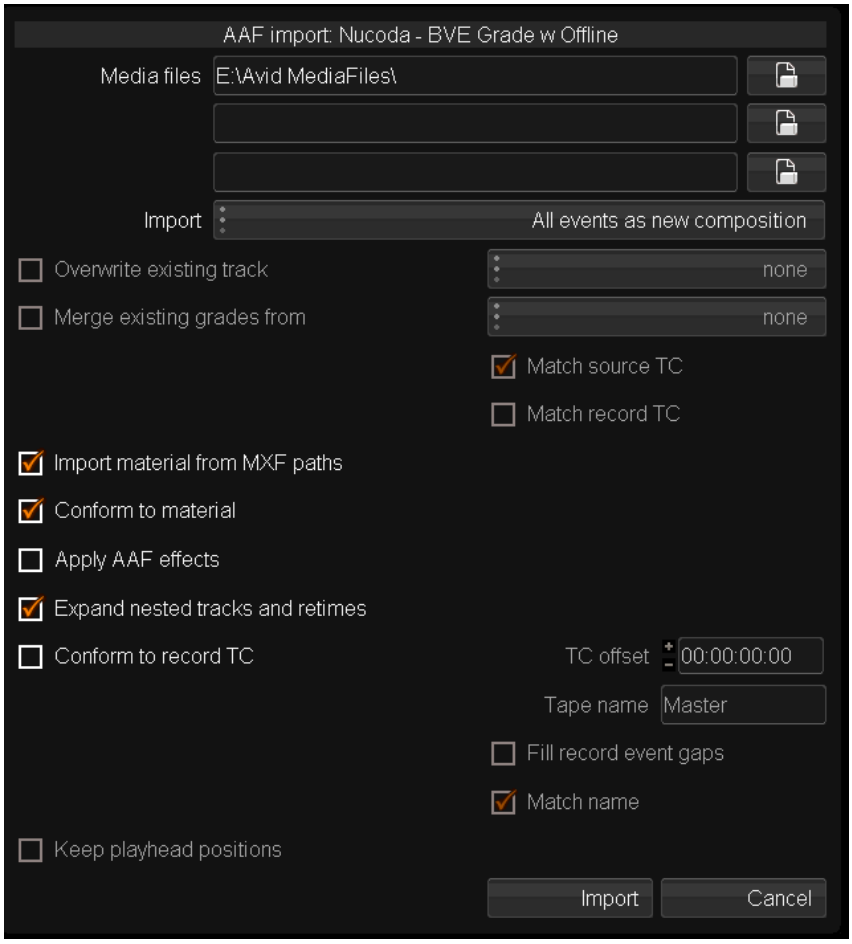
Do **not delete or move** the AAF you import to the Nucoda. If the AAF you import is deleted or moved, you will not be able to export an AAF from the composition it creates. We recommend you manage your AAF files carefully and keep copies locally. This includes network drives where drive letter may change.

If you are not having any success, please check in the library where the AAF file is expected to be and verify it's existence.



Nucoda AAF Import Options

The various options available on AAF import to Nucoda are described below.



Media files	Set to the top-level Avid media files folders. Each is searched in turn for MXF media related to the active AAF composition. The GUI allows the configuration of three folders. The general.prefs preference file lets you configure more. See Media Files below.
Import material from MXF paths	Ensure we load source material if we locate it on disk
Apply AAF effects	If Avid renders (*pre-computes*) are available, we can select this to use them in the Nucoda system. *Avid Transitions* (i.e. wipes, dissolves, 3D transitions etc.) will be displayed as *dissolves* on the Nucoda timeline, **even if they are rendered** on the Avid. If you need these, generate a *mixdown*. See Transitions. **NOTE :** If you are planning to **finish on the Nucoda**, or use the *Record AAF Workflow*, you should use this option to ensure that your sequence appears in Nucoda fully rendered.
Expand nested tracks and retimes	This will expand any *nested effects* you have in the AAF, placing the various source constituents on the Nucoda timeline over the appropriate number of tracks. See Nested Effects. *Motion effects* will be displayed as a Nucoda adjustment segment at the correct length of the effect in the sequence. The full length source media is placed below the *adjustment segment* on a separate track. See Retimes. **NOTE :** If you are planning to **finish on the Nucoda**, or use the *Record AAF Workflow*, you should ***not*** use this option on import.

Media Files

The *Media Files* setting lets you configure the paths searched for MXF media referenced by the active AAF file.

The GUI lets you configure *three* paths. More search paths can be set in the *general.prefs* file :

```
mxf
{
    avidDirectory "I:\Avid MediaFiles\" "G:\Avid MediaFiles\" ...
}
```

Only the first *three* values will be displayed in the *AAF Import* dialog window.

Top-Level Folders

Each *Media Files* search path has to be set to the ***top-level*** folder or the search will fail to find media (and an error dialog will appear, see below). The top-level folder *contains* an MXF folder.

Correct : `I:\Avid MediaFiles`

Wrong : `I:\Avid MediaFiles\MXF\DVAVID.1`

Edit Modified AAF Back to Avid

In this work flow, the Nucoda system exports an AAF to the Avid for finishing.

> Note that the *Edit Modified AAF back to the Avid* route is only available for Nucoda compositions **originally created from imported AAF files**.

This is illustrated in *Figure 1 below.*

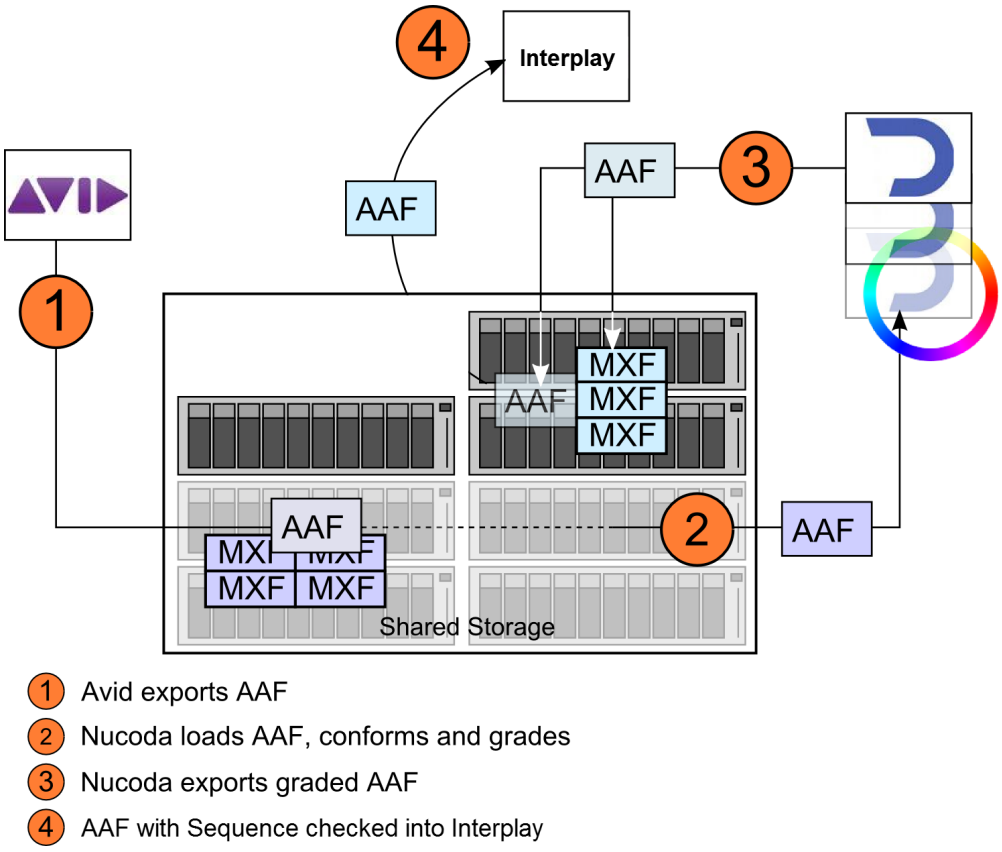
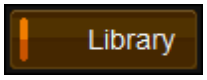


Figure 1 : Edit Modified AAF from Nucoda back to Avid

Nucoda Exports Edit Modified AAF

In the Nucoda application, we will export the AAF :

Switch to the *Library* :



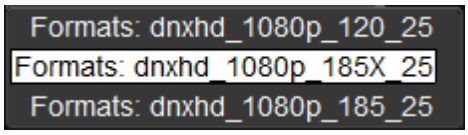
And press the *..Export Media* button :

Navigate to the location we wish to write our exported AAF file to (this should be shared with the Avid).

Note that the location chosen here will be for the **AAF file only**. The MXF media is exported at the same time *automatically* and placed in the **first** defined Media Folder.

Set Format and Options

Set your export format as AAF and choose a media export format (e.g. Avid DNxHD 185X) :



The formats made available will depend on your *project* format.

You will not be able to set *handles* or choose *uncompressed MXF* formats when exporting an AAF.

You should also choose to export using one of the *modes* :

- Tracks Multi Src TC
- Visible Multi Src TC

See the Export Modes section for definitions of the export modes mentioned above.

Name your AAF file and press the *Export* button.

MXF Staging

Note that MXF files created as part of an *AAF export* are *staged* in the `tempRootDir` folder before being moved to their final destination. See MXF Staging.

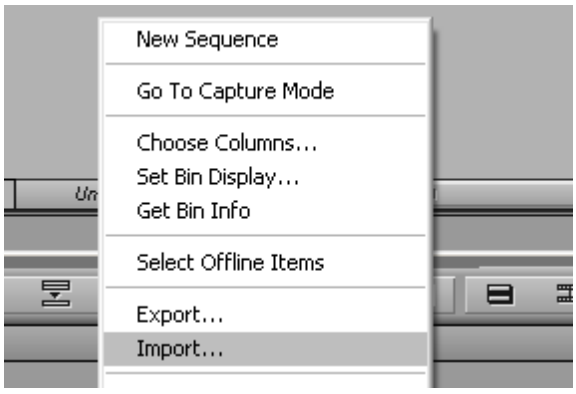
Once all the associated MXF media files have been successfully exported, the AAF file that was used to create the composition will be copied to the exported AAF file and its media references updated to reference the new MXF media.

Avid Imports Edit Modified AAF

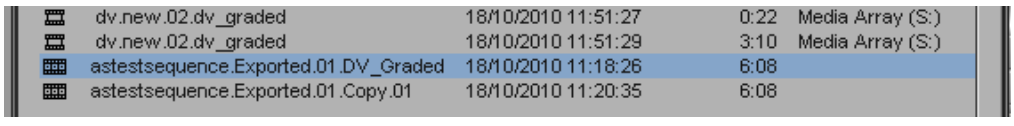
When the updated (graded/restored) AAF is available, the Avid can import it into a *Bin.*

When the Nucoda system writes new media to an Avid media folder, the Avid system will do an *automatic re-scan* of media folders :

Right-click inside your chosen Bin and select *Import...* :



Navigate to the folder containing the new AAF, select it and *Open*. The AAF is imported and appears in your *Bin* :



Note that the graded sequence is tagged *DV_Graded*.
Graded media files are tagged *dv_graded*.

This makes sorting and searching your Bin easier.

Double-clicking the sequence will activate it and let you review and continue.

AAF Back to Avid with Interplay

In this work flow, the Nucoda system exports an AAF to the Avid for finishing and selects to do an *Avid Interplay* **check-in**. See *Figure 3* below.

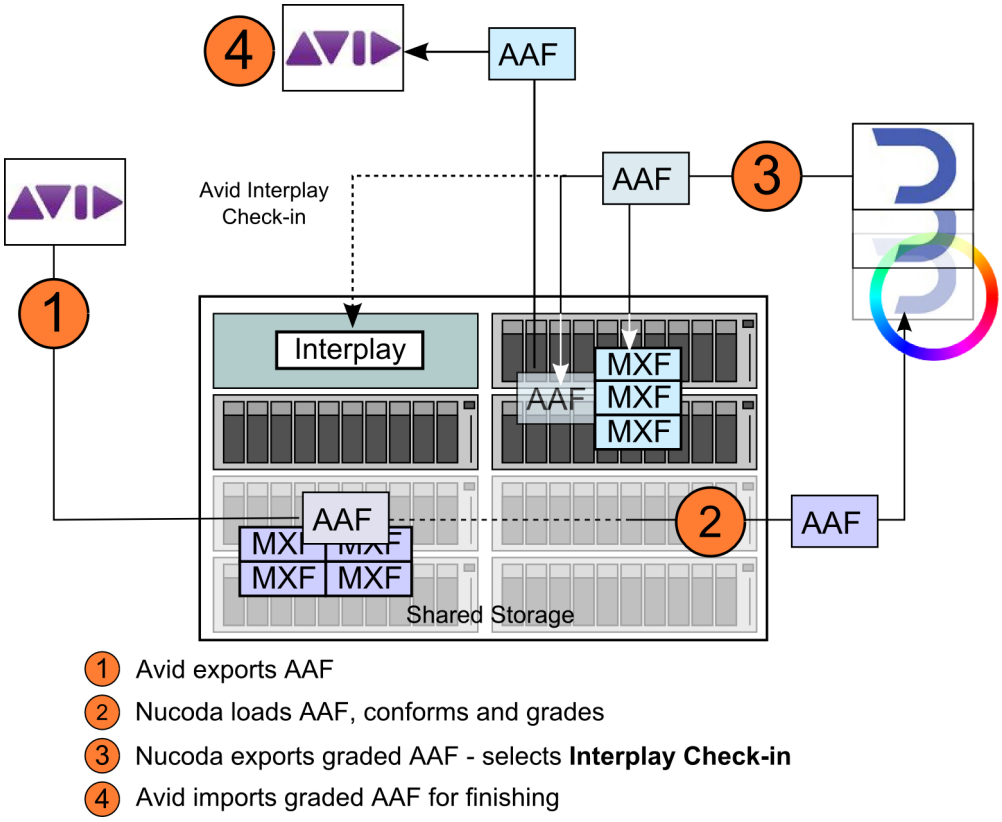


Figure 3

This work flow is almost identical to work flow 1 AAF Back to Avid.

For Nucoda *Interplay* setup, see Interplay Setup.

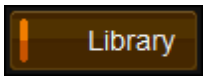
Interplay Licensing

Avid Interplay check-in require an Interplay *login*, which requires an Interplay ***license***. You will need to make sure you have enough licenses to cover every client using the Interplay system or your Nucoda checkins will fail (the error will be reported in the Nucoda console).

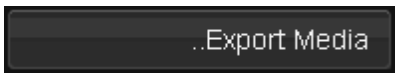
Nucoda Exports Edit Modified AAF

In the Nucoda application, we will export the AAF :

Switch to the *Library* :



And press the *..Export Media* button :

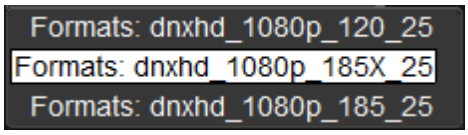


Navigate to the location we wish to write our exported AAF file to (this should be shared with the Avid).

> When using the *Export AAF function*, MXF media will automatically be exported to the first Avid Mediafiles directory specified in the general.prefs file. Typically this will be S:\Avid Mediafiles. The location specified in the export process is the location for the new (edit modified) AAF file.

Set Format and Options

Set your export format as AAF and choose a media export format (e.g. Avid DNxHD 185X) :



> The formats made available will depend on your *project* format.

> You will not be able to set *handles* or choose *uncompressed MXF* formats when exporting an AAF.

You should also choose to export using one of the *modes* :

- Tracks Multi Src TC
- Visible Multi Src TC

See section Export Modes.

Export and Check In

Select the *Export to Interplay* box :

With the export to Interplay option selected, MXF media will automatically be placed in the folder specified in the Interplay configuration in the general.prefs file. These media files will also be checked in to Interplay and indexed, provided that the Interplay Volume is indexed by a *Media Indexer*.

Name your AAF file and press the *Export* button.

MXF Staging

Note that MXF files created as part of an *AAF export* are *staged* in the `tempRootDir` folder before being moved to their final destination and checked into Interplay. See MXF Staging.

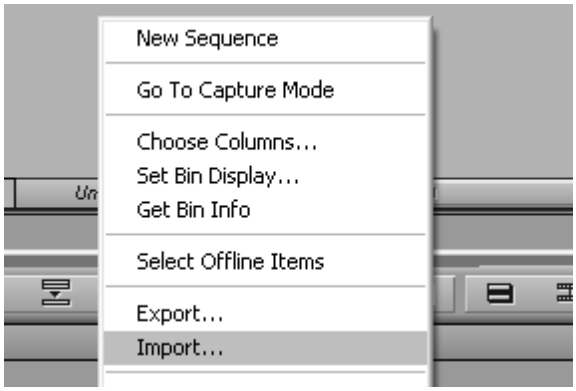
Once all the associated MXF media files have been successfully exported, the AAF file that was used to create the composition will be copied to the exported AAF file and its media references updated to reference the newly exported MXF media.

Avid Imports Edit Modified AAF

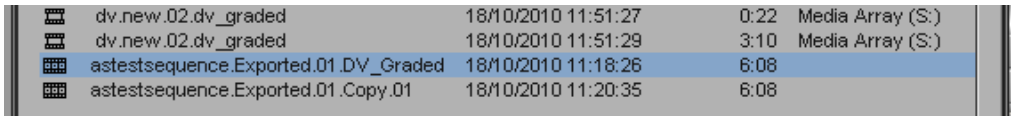
When the updated (graded/restored) Edit Modified AAF is available from the Nucoda system, the Avid can import it into a *Bin.*

When the Nucoda system writes new media to an Avid media folder, the Avid system will do an *automatic re-scan* of media folders.

Right-click inside your chosen Bin and select *Import...* :



Navigate to the folder containing the new AAF, select it and *Open*. The AAF is imported and appears in your *Bin* :



Double-clicking the sequence will activate it and let you review and continue.

Interplay Setup

Avid Interplay is a sophisticated asset management system that manages and tracks digital media throughout a production. Some configuration is required before using an *Avid Interplay* system with a Nucoda.

Preference File

The main Nucoda preference file general.prefs contains an *Interplay* section which defines various setup parameters. You will need to change these to reflect your local installation :

```
interplay
{
  host "INTERPLAY HOST NAME"
  port "INTERPLAY PORT"
  workgroup "AVID_WORK_GROUP"
  folder "PROJECTS/FOLDER"
  username "USERNAME"
  password "PASSWORD"
  sharedStorage "\\UNITY_OR_ISIS\WORKSPACE\Avid Mediafiles\MXF\1"
}
```

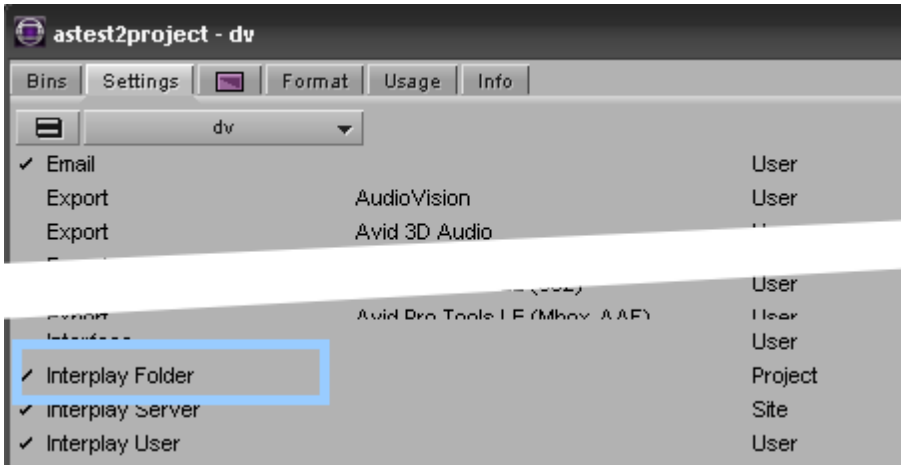
The *Interplay* section is pre-configured by default but you will need to remove the inserted "<" and ">" characters used to complete the configuration correctly e.g. replace `"<username>"` with `"david"` (for example).

Interplay Settings

host	This is the name of the machine running the Interplay services. e.g. `mojito`
port	The port the Interplay services run on. e.g. `80`
workgroup	This is the Avid workgroup name (note this is not the *Windows* workgroup). e.g. `MyWorkgroup`
folder	This is the name of the folder Interplay is configured to use for the *active* project (see below). e.g. `"Projects/Upstairs Downstairs"`
username	This is the username the Nucoda uses to log in to the Interplay. e.g. `david`
password	The password. e.g. `david123`
sharedStorage	A path to shared storage used by the Nucoda and the Interplay. e.g. `"\\isis\sharedmedia\Avid Mediafiles\MXF\1"` **This path must be in Windows UNC notation.** **MXF files we write from the Nucoda system are placed here.**

Interplay Projects

The *Interplay* folder settings are configured in the Avid project *settings window* as shown below :



Avid project settings showing Interplay Folder parameter

Note that the Avid project name is configured **inside** the general. prefs file and is not available as a GUI preference. This means you need to **restart** the Nucoda application if you want to check your media into a **different** Interplay project.

Record Order AAF Out

In this work flow, the Nucoda system exports an AAF to the Avid for finishing.

> Note that the *Record AAF back to the Avid* route is only available for Nucoda compositions **originally created from imported AAF files**.

This is illustrated in *Figure 1 below.*

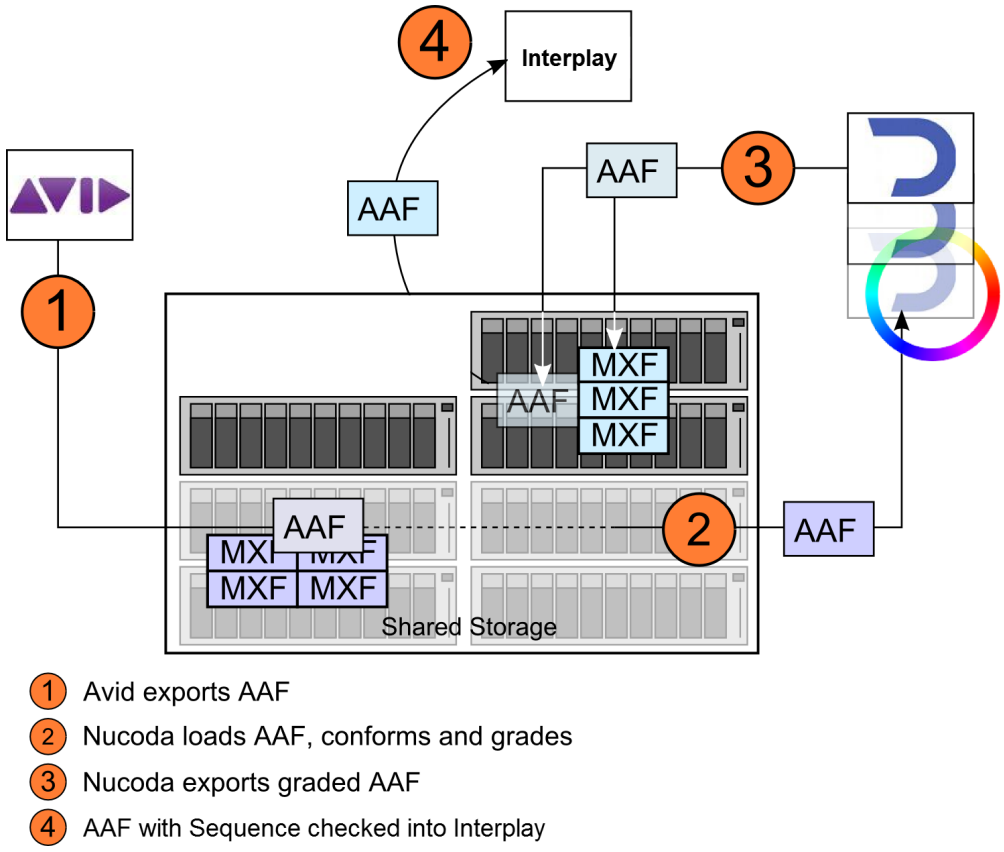


Figure 1 : AAF from Nucoda back to Avid

This work flow is almost identical to workflow 1 Edit Modified AAF Back to Avid.

The biggest difference is that in this workflow we create a new AAF for import into Media Composer or check in to Interplay.

- Import AAF from AVID with completed content, including mixed down audio and rendered effects.
- Import AAF material from MXF paths into Nucoda, using the rendered effects option.
- Grade material.

- Export new AAF - Record order - with media as single completed mixed down sequence with record timecode and referenced audio in the AAF.
- Import into Interplay or use check in from Nucoda

Supported audio format for this workflow

- Mono tracks
- 48KHz
- 16Bit
- PCM (MXF)

We import the AAF and use settings :

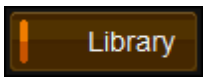
- All events as a new composition
- Import material from MXF paths
- Conform to Material
- Use AAF effects

See the Nucoda AAF Import Options section for a full description of the available settings.

Export Record Order AAF

In the Nucoda application, we will export the AAF :

Switch to the *Library* :



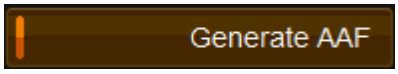
And press the *..Export Media* button :

Navigate to the location we wish to write our exported AAF file to (this should be shared with the Avid).

Note that the location chosen here will be for the **AAF file and the media**.

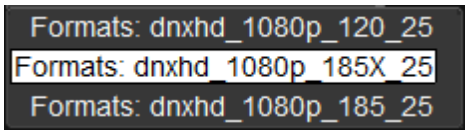
Set Format and Options

Set your export format as MXF



Note that the generate AAF button will only appear if your sequence originated from an AAF file

Select and choose a media export format (e.g. Avid DNxHD 185X) :



The formats made available will depend on your *project* format.

You should also choose to export using :

- Mixdown Record Order TC

See the Export Modes section for definitions of the export modes.

Name your AAF file and press the *Export* button.

MXF Staging

Note that MXF files created as part of an *AAF export* are *staged* in the `tempRootDir` folder before being moved to their final destination. See MXF Staging.

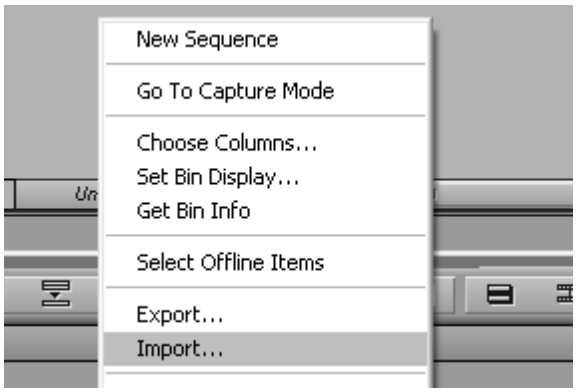
Once all the associated MXF media file have been successfully exported, a new AAF will be created containing a sequence referencing to the original Audio tracks and also the new *Mixdown* video track.

Avid Imports Record Order AAF

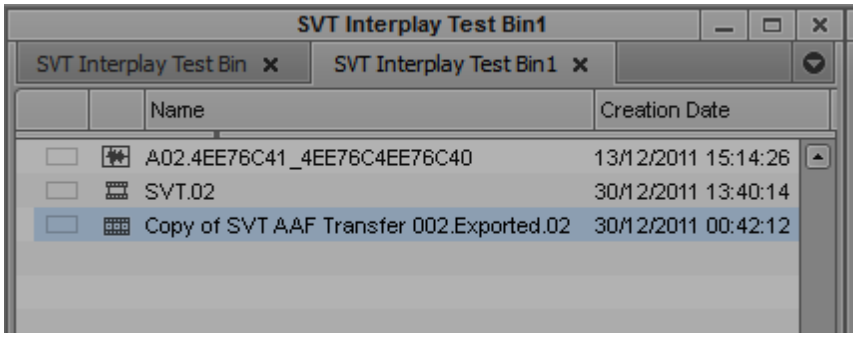
When the updated (graded/restored) AAF is available from the Nucoda system, the Avid can import it into a *Bin.*

When the Nucoda system writes new media to an Avid media folder, the Avid system will do an *automatic re-scan* of media folders :

Right-click inside your chosen Bin and select *Import...* :



Navigate to the folder containing the new AAF, select it and *Open*. The AAF is imported and appears in your *Bin* :



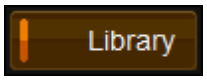
Note the AAF will contain one video file, audio files and a sequence.

Double-clicking the sequence will load it and let you review and continue.

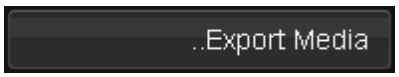
Automatic Check In to Interplay

In the Nucoda application, we will export the AAF and check it into Interplay:

Switch to the *Library* :



And press the *..Export Media* button :



Navigate to the location we wish to write our exported Media file to (this should be shared with the Avid).

Note that the location chosen here will be for **the media**.

Set Format and Options

You have to export using :

- Mixdown Record Order TC

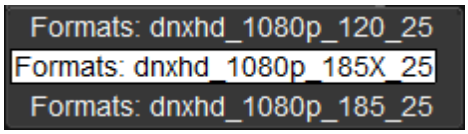
See the Export Modes section for definitions of the export modes.

Set your export format as MXF

Select Generate AAF, that will then allow you to select *Check-In To Interplay*

Note that the *Generate AAF* button and *Check-In to Interplay* buttons will only appear if your sequence originated from an AAF file

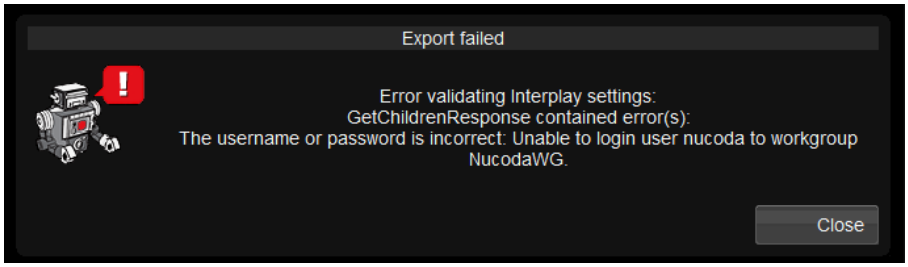
Select and choose a media export format (e.g. Avid DNxHD 185X) :



The formats made available will depend on your *project* format.

Name your file and press the *Export* button.

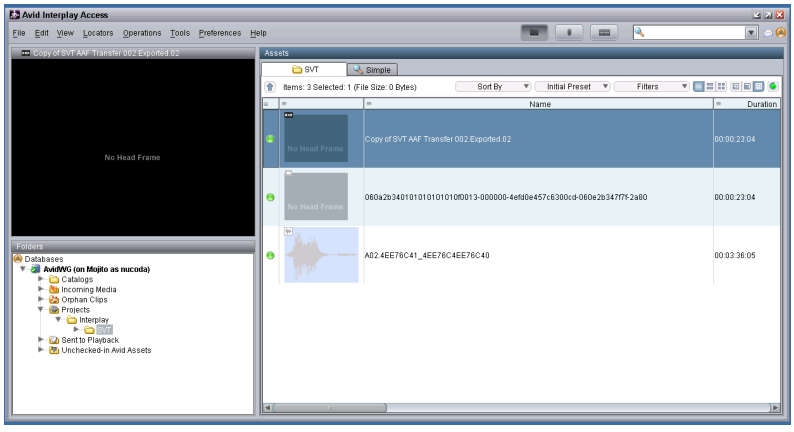
IF there are any problems with the Interplay setup, you will receive an error message giving you a description of the issue



MXF Staging

Note that MXF files created as part of an *AAF export* are *staged* in the `tempRootDir` folder before being moved to their final destination. See MXF Staging.

Once all the associated MXF media file have been successfully exported, a new AAF will be created containing a sequence referencing to the original Audio tracks and also the new *Mixdown* video track, it will be checked into Interplay, under the project selected in the general.prefs file.



MXF Back to Avid

In this work flow, the Nucoda system exports MXF media back to the Avid for finishing.

> This work flow is MXF media export only. No AAF file is exported.

This is illustrated in *Figure 2 below.*

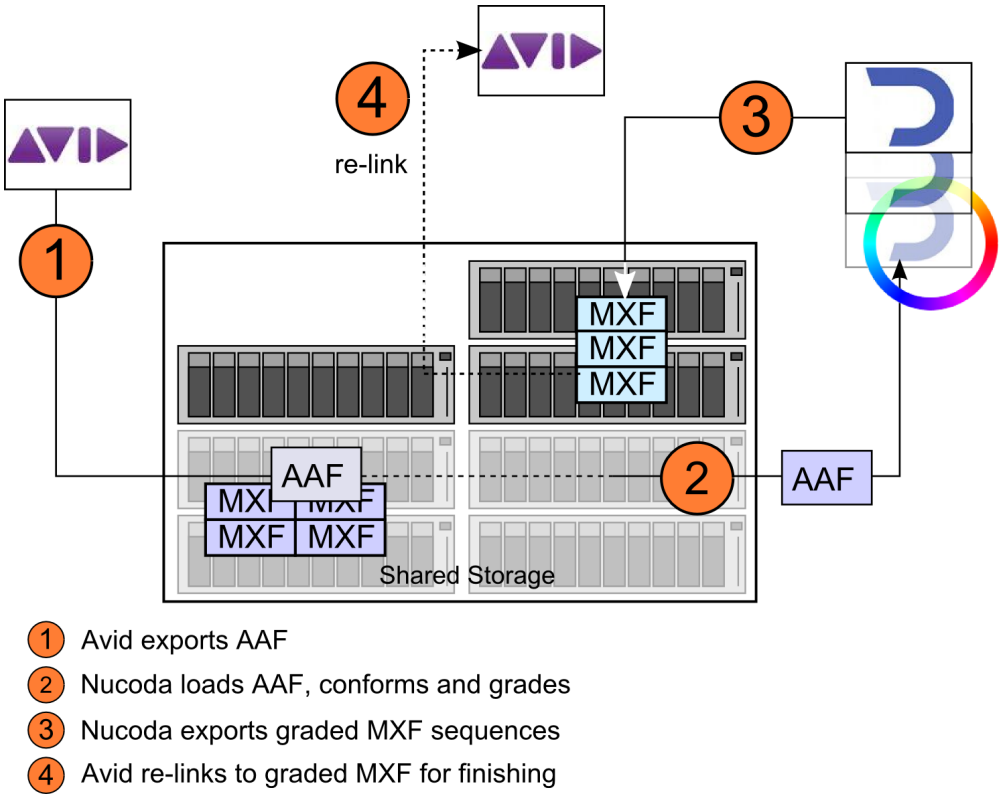
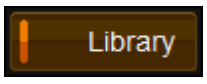


Figure 2

Nucoda Exports MXF

In the Nucoda application, we will export the MXF sequences for the Avid to re-link.

Switch to the *Library* :



And press the *..Export Media* button :

Choosing MXF Export Folder

For the Avid to be able to successfully re-link to the new MXF media, we need to write the exported MXF files to the correct place.

The correct place is the **lowest level** of **one** of the *Avid MediaFiles* folders used by the Avid.

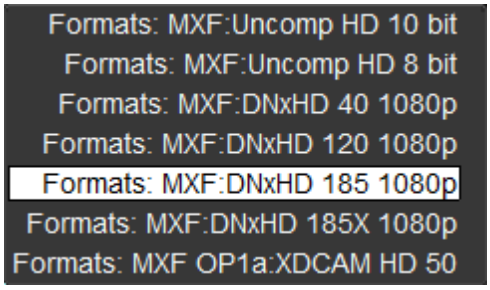
> This means the full MXF path needs to be at the **same** *media files* folder level as the other MXF source media e.g.
>
> **Correct :** `G:\Avid MediaFiles\MXF\1\`
>
> **Wrong :** `G:\Avid MediaFiles\`

Set Format and Options

Set your output format to be MXF :

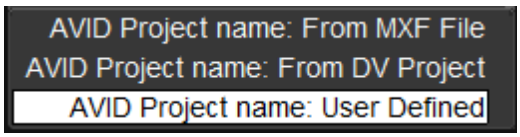
MXF Codec

Then choose your desired MXF export format :



> Note that unlike exporting an AAF in the AAF Back to Avid work flow, you can set *handles* and choose an *uncompressed MXF* format.

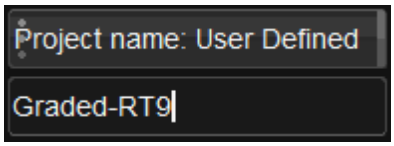
Avid Project Name



Write a *project name* in the MXF files. Choose the project name :

- From the MXF File
- From the Nucoda project name
- User Defined

It is recommended to set a *User Defined* project name. Type a name into the text box :



The *Project Name* can be any text string and can be used to filter and identify Nucoda media once back in the Avid system.

Export Mode

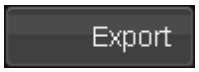
Choose to export using a *Multi* format :

- Tracks Multi Src TC
- Visible Multi Src TC

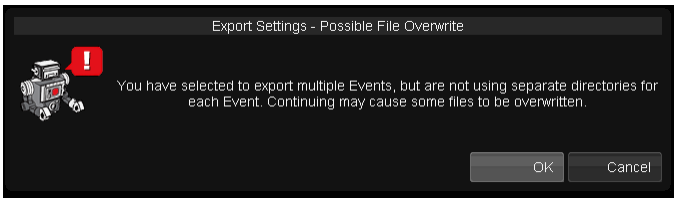
See section Export Modes.

Export

Press the *Export* button :



You will get a warning about *Possible File Overwrite* because you are using a *Multi* mode export but not specifying separate folders:



Dismiss (and ignore this) by pressing *OK*.

MXF Staging

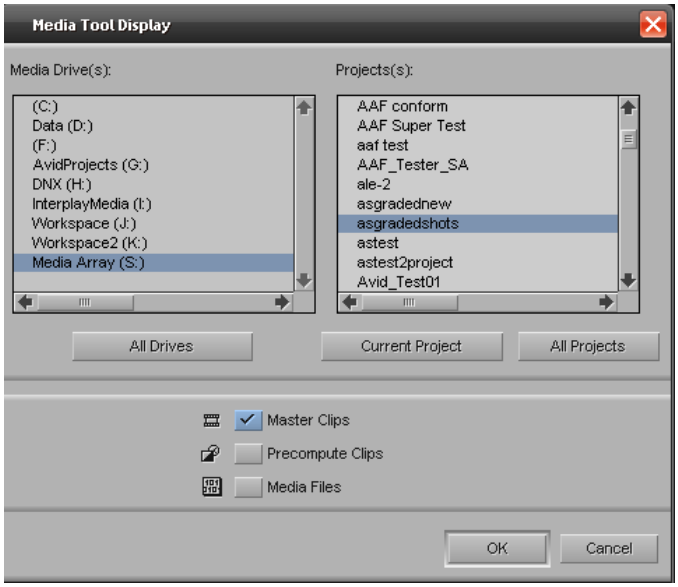
Note that MXF file exports can be *staged* in the `tempRootDir` folder before being moved to their final destination. See MXF Staging.

Avid Relinks MXF

When the updated (graded/restored) MXF media from the Nucoda system appears in the *Avid MediaFiles* folder, the Avid system does an automatic *re-scan* to update its media index.

Media Tool

Once the re-scan has completed, open the *Media Tool* (***Tools / Media Tool***).



Avid Media Tool

The *Media Tool* lets you select a *Media Drive* and a *Project* to scan and use for media :

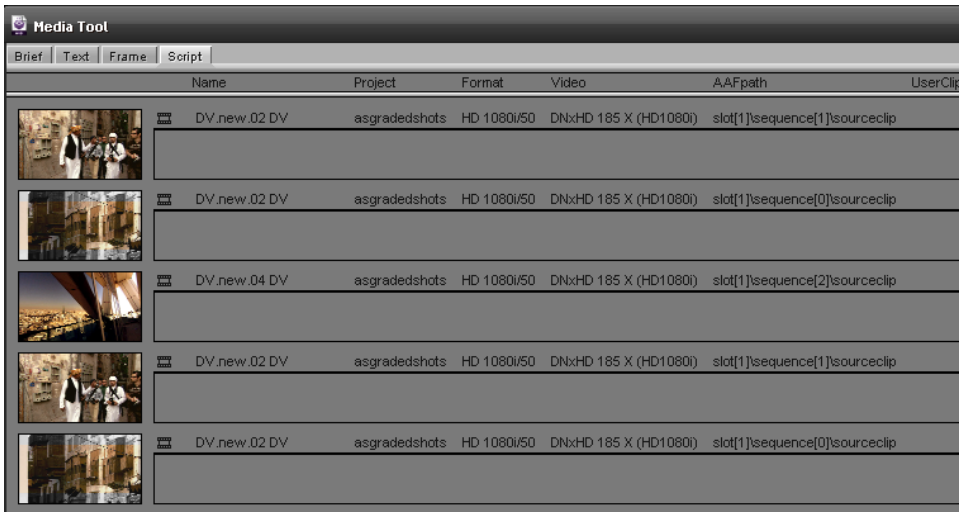
Select :

- The *Media Drive* used for the MXF media you exported
- The *Project* name you used for the MXF export

The project name is the one you entered in the *Project Name : User Defined* text box when exporting the MXF media in the Nucoda.

The *Media Tool* will open and show you a list of shots found matching the

search criteria, including project name.

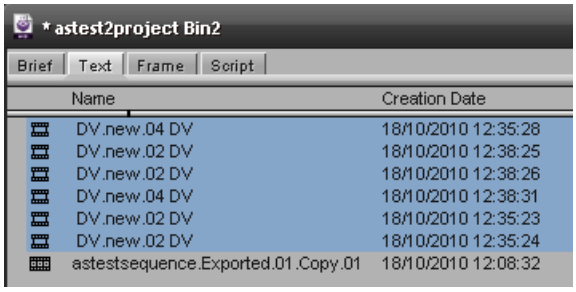


Media Tool shot list

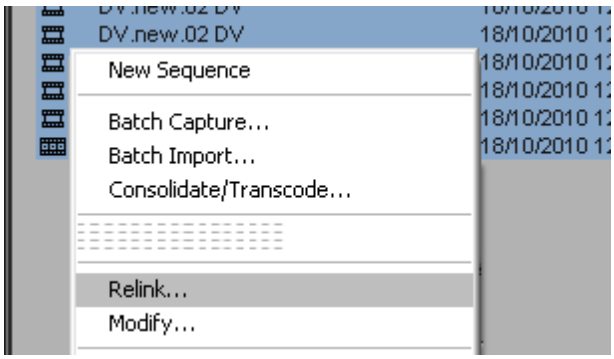
The *Media Tool* lets you organise, sort and sift the media.

Relinking

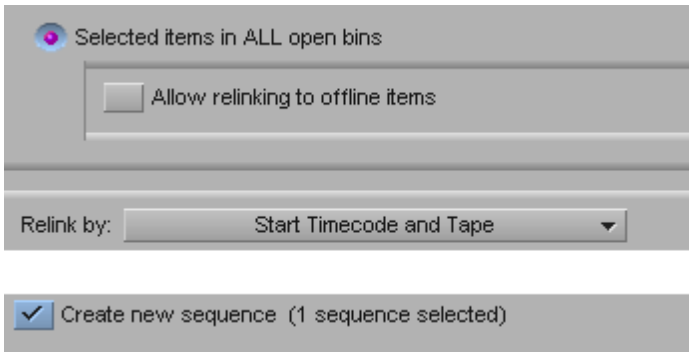
Duplicate your AAF sequence and move it into a new Bin. Then drag and drop your new shots from the *Media Tool* into this new *Bin*.



With the shots selected (as shown above), right-click the sequence and select : *Relink...*



The *Relink* dialog window opens.



Select :

- Selected items in ALL open bins.

> It is best to *close* other bins to avoid incorrect re-linking.

- Relink by : Start timecode and tape
- Create new sequence

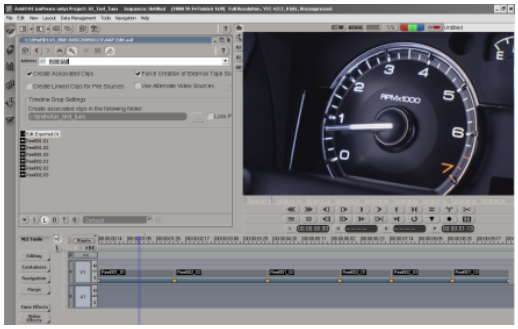
The new imported sequence created is activated in your monitor.

> Note that if you use two or more **identical clips** on your timeline (same *timecode*, *tapename etc.*), but using different grades, then they may re-link *incorrectly*. The clips may re-link such that they now have the *same* grade.
>
> However, the correctly graded clips should be available in your *Avid Media Tool* and can be found and spliced in to the track.

> Avid *pre-computes* will **not re-link**. However, they will be available in the *Media Tool*.

Avid DS

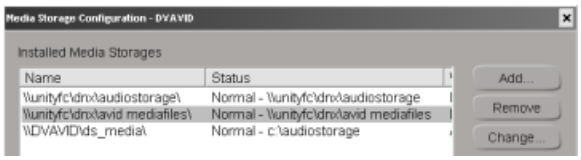
The *Avid DS* workflow integration is much simpler to that of *Media Composer*. There is no need to *rescan* the database, *decompose* any clips or *relink* any media manually. This is all done automatically and transparently.



Once completed, the Nucoda exports the finished sequence as **MXF media** as described previously.

A Note on DS Media Storage

Note that the Avid DS has a list of defined *Media Storage* folder locations, configured via menu *Data Management / Configure Storages ...*



DS Media Storage	Windows Name
`\\unityfc\dnx\avid mediafiles\`	`K:\Avid MediaFiles\`

These are predefined for specific storage configurations and media types e.g. *MXF video files.*

You can export the graded MXF files to any folder within this root folder. The DS indexes these folders and will pick up the new MXF files automatically.

DS Relinking

Once the new graded MXF files have been exported, the Avid DS will *re-index* and pick these up **automatically**. The DS timeline will refresh and reflect the new graded sources, and no manual intervention is required.

The DS may take a short while to refresh, depending on the length of your timeline and the size of the media databases.

DS Effects

If any shots on the DS have *effects* applied, these effects will be re-applied automatically to the newly graded MXF sources when they are re-linked.

MXF Staging

When writing MXF files to a *network* volume, it is often more efficient to write the files *locally* first and then *move* them to the target location.

This is called *staging*.

Staging is particularly useful when exporting to *Avid Unity* or *ISIS* systems. Test your configuration to see which settings are best for your workflow.

Staging Folder

If staged, MXF files are first written to the folder specified by the *general.prefs* configuration parameter (inside *media* section) :

```
tempRootDir "X:\path\to\folder\"
```

When Staging Happens

AAF Export

If you are exporting an AAF file, the MXF files created are **always staged** to the folder specified in `tempRootDir`. Once successfully written, they are moved to the **first** *Avid MediaFiles* folder specified in the preference file.

If you have enabled *Export To Interplay*, once successfully written, they will be moved to the *Avid Interplay* `sharedStorage` location (see the *general.prefs*) and checked in.

MXF Exports

If you are exporting MXF files, the MXF files will be staged if the following *general.prefs* configuration parameter (inside *mxf* section) is set to true :

```
useTempAsStaging  true
```

When set to true, MXF files are staged to the folder specified in `tempRootDir`. Once successfully written, they are moved to the **first** *Avid MediaFiles* folder.

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Avid Effects

This section describes the support for various Avid effects in the documented work flows, including any caveats around them.

This list is not exhaustive. Please direct any feedback to us through the web forums at :

http://forum.imagesystems.se

Rendering Avid Effects

When exporting an AAF from the Avid, one of the *Export Settings* available is *Render Video Effects* :

Enabling this will cause the Avid AAF export process to **render all timeline effects**. Avid calls these renders *pre-computes*.

If you are planning on returning to the AVID via AAF, we would recommend that you do **not** select the *Apply AAF effects* option on import into the Nucoda.

Pre-Computes

Introducing *pre-computes* to the work flow adds some extra complexity that you will need to be aware of :

- Pre-compute clips will **not re-link** on return to the Avid. They will also not be updated in the exported AAF (an Avid limitation).

  However, the Nucoda processed (e.g. graded) pre-computes shots *will* appear in the Avid *Media Tool* and are therefore available to you for manual timeline addition.

- *Merging* the grades into updated AAF sequences will **not work** for pre-compute shots because they do not contain *timecode* or *tapename* information.

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Make sure all effects used in the Avid are **fully rendered** (no *partial* renders).

By default, Nucoda treats all transitions as dissolves, if you sequence contains any transition such as 3D wipes or spins, you will have to mix these down for them to appear in the AAF, renders will just come accross as dissolves.

Retimes

If we select to expand retimes on AAF import, the Nucoda system generates AAF retimes through the use of Adjustment Segments.

An alternative method of transferring retimes is to use a *mixdown*.

This has the advantage of :

a) Keeping the *complete* source material available.
b) Keeping the timeline *synchronised.*
c) *In the case of timelapse material there could be a large amount of material for rendering and transferring.*

Freeze Frames

When using the *freeze frame* effect in the Avid, rather than have the Nucoda build it using an Adjustment Segment, you might prefer to export the single (frozen) frame and re-import it into the Avid to create the freeze frame segment (in effect, rendered to the right duration), or create a Video Mixdown.

This is due to the fact the the Freeze Frame is represented as a single frame on the timeline if used.

Nested Effects

Avid Media Composer and related products allow you to wrap *multiple tracks* and *multiple effects* inside a **single** video track segment. This *compound* segment is called a *nest* and renders a single visible output.

Because *nested* effects add complexity to the timeline we import and process, it is best to **minimise** their use.

The Nucoda currently supports *simple* nests only.

On import to the Nucoda, *dissolves* are **removed** from *nests* on expansion .Each clip in the nest is placed on its **own track**, even if a clip sits beside another on the same track inside the nest.

Transitions

Currently, all Avid *transitions* are treated as *dissolves* in the Nucoda. Transitions are **not displayed** even if they have been rendered and are available.

To include transitions in rendered timelines, supply them as a ***mixdown***.

Dip To Colour

The *Dip To Colour* effect applied as an effect to a cut will not work.

Apply as separate *effects* at the start or the end of a clip.

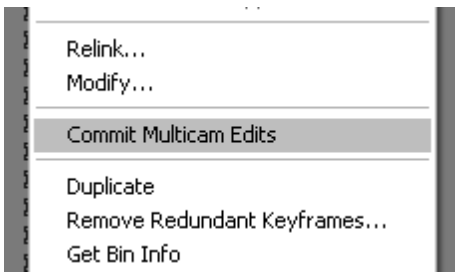
Avid Multicam

You should **commit** *multicam* edits before exporting an AAF for use in the Nucoda system.

Avid Media Composer 5 and 6

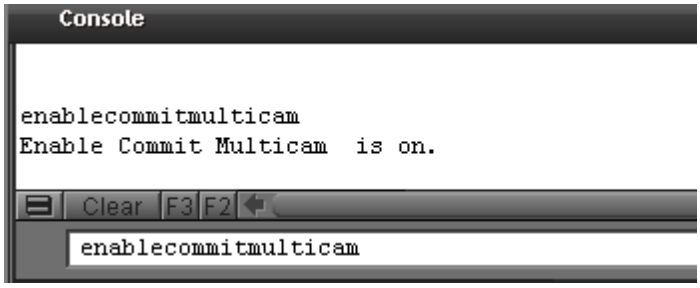
This option is available in he GUI :

- Select your sequence in the *Bin*
- Right-click and *Commit Multicam Edits*



Older Versions

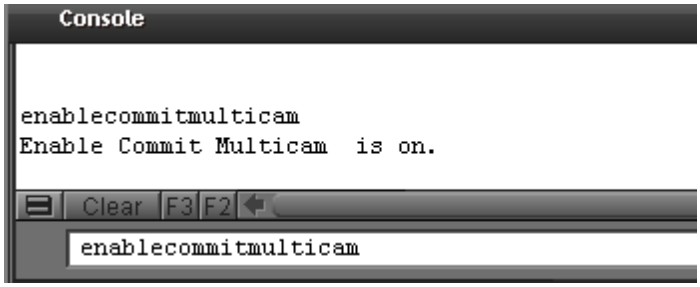
Select *Tools* / *Console* :



In the console, type :

```
enablecommitmulticam
```

and press <ENTER>.



Now *commit* the multicam edits by right-clicking your sequence and selecting:

Commit Multicam Edits

This will create a copy of the original sequence before the sequence is changed. The sequence without *multicam* edits will be tagged *NoGroups* and can be exported as an AAF for conforming on the Nucoda system.

See your Avid manual for details.

Subclips

Avid s*ubclips* are not currently supported and should be removed before transferring the sequence to the Nucoda.

There is a documented process to easily relink *subclips* to *master-clips*. Refer to your Avid documentation.

(The text below is taken from the Avid Help file)

Relinking to Selected Clips

You can also use the *Relink* command for connecting subclips or sequences to selected master clips and subclips.

To *relink* to selected master clips and subclips:

1. Move the subclips or sequences that you want to relink into the bin containing the clips.
2. Select the clips targeted for relinking.
3. Select *Clip* > *Relink*
4. Select *Relink all non-master clips to selected online items* to relink related subclips or sequences to the highlighted clip in the bin.
5. Click the *Relink to media on volume* menu, and select an option:

   Select All Available Drives to search across all media drives that are online.

   Select a specific drive volume if you know the location of the media or if you want to relink to media on a specific media drive.

6. (Option) Select *Relink only to media from the current project*.
7. (Option) Select *Match case when comparing tape names*.
8. Click *OK*.

The subclips or sequences are linked to the selected clips or subclips.

Note that the Avid method for removing sub-clips is not applicable to *Avid Interplay*.

Add Edits

If you have a single clip containing *Add Edits* (or *scene* edits), the Nucoda will correctly see the these edits when imported.

However, once graded and exported, when the the new AAF is imported to the Avid system, only the **first** part of clip will be seen to be graded. All the graded material is available as part of the first clip so it can just be extended or cut in from the Avid Bin.

As a workaround, when using *Add Edit*, make sure each segment you create is placed on a different video track to the segments beside it.

Add Edits segments separated to break links between them.

If you used *Add Edit* with *dissolves*, the Nucoda will automatically export enough material to rebuild them.

Red Support

23

2014.1

Red Support 23

Digital Vision applications fully support the RED R3D file format, the native recording format of the RED ONE camera. Support includes :

- File import
- Dynamic multi-resolution decoding
- Conforming from an EDL (using tapename or clipname)
- Realtime playback [1]

> For **important advice** on working with R3D files, see the Tips section.

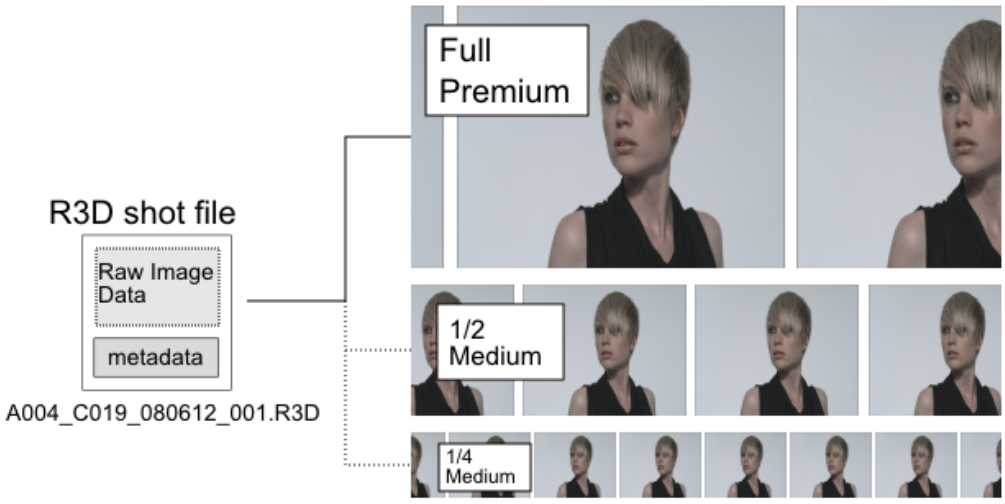
[1] Note that *realtime* playback capability will depend on the size and quality decoded from the R3D file and your hardware.

Format and Conventions

The R3D file is a ***12 bit RAW*** format that supports high resolutions and high dynamic range images.

> A full dynamic range is preserved by extracting the raw R3D data at **16 bits** but we may later choose to work with 10 bit DPX files. See the section Properties and Metadata.

The RED ONE camera can shoot at a number of different resolutions and the highest resolution shot will determine the resolution of the main *Full Premium* decode.



Dynamic decoding of the Red R3D raw image data.

Each resolution is defined by its size and its quality.

Full Size and *Premium Quality* is the maximum resolution the camera has shot and this will determine the alternative decode formats available. The *1/2 Premium* mode is half the pixel resolution but the same decoding quality.

The table below show the possible decode resolutions for the **RED ONE 4K** camera shooting its maximum resolution of **4096x2304**.

Size	Quality	Width	Height
Full	Premium	4096	2304
1/2	Premium	2048	1152
1/2	Medium	2048	1152
1/4	Medium	1024	576
1/8	Medium	512	288
1/16	Medium	256	144

Note that a *Full Premium* decode of a **2K shot** will have a resolution of 2048 x 1152.

Full Premium (at 4K) is supported on **64 bit Windows only**.

Files and Folders

By convention, the R3D filename encodes some basic *metadata*.

The R3D filename `A004_C019_0806UL.R3D` encodes :

A	The camera identifier
004	The clip identifier
C019	The reel identifier
0806UL	Year (2 digits), Month (2 digits), 2 *random* characters [1]
.R3D	The RED ONE file extension

[1] Previously, these six characters were the *GMT date* (format YYMMDD) e.g. `A004_C019_080612.R3D`

This was recently changed to replace the *day* part with two *random* characters. This is to help prevent file paths being duplicated thus risking overwriting shots.

These random characters do not exist in the R3D file header metadata. This means we now have to conform using tapename or clipname from *filename* (not file header). See the Conforming with RED section.

RED .R3D files usually come in a folder structure where each folder contains a **single shot**. The folder structure may appear as follows :

```
S:\media\projects\test1\A004_C019_0806UL.RDC\

  A004_C019_0806UL_001.R3D
  A004_C019_0806UL_002.R3D
```

The filename numerics (_001 etc.) do not specify frames. The R3D shots are split into **2 GB** chunks due to the limitations of the file system used to save the files. Our application will see and import this "clip" as a single shot.

Tapename

The tapename metadata element will be extracted from the R3D *filename*.

Tapename : **A004_C019_0806UL**

The Conforming with Red section discusses both *tapename* and *clipname* as they relate to the conform process.

Properties and Metadata

The RED R3D format contains a wide variety of metadata. Some of the metadata is fixed and will be displayed only. Other metadata elements are variable and can be edited.

We can edit the non-fixed R3D metadata elements in the library via the *Library/Properties* dialog. We can also choose to set the **default** values for some on file import and capture/conform.

The RED R3D file header also contains a *frame rate*. This is shown in the library and set on the imported R3D shot. This frame rate may be **different** to the main project rate, or current composition rate. This may cause problems for you if you create an EDL from the composition and need to use it to re-conform to the R3D shots later.

Default Settings

The user can specify certain defaults to use for the following metadata elements :

- Decode Quality
- Gamma Curve (via project *colour scaling* setting)
- Bit depth
- *Create Clone* setting
- OLPF Compensation
- Detail

Viewing and Setting Properties

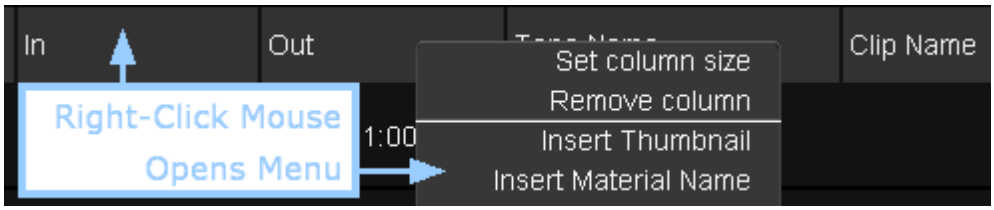
View the properties of an R3D shot in the application *library* or via the .. *Properties* dialog window. The *Properties* dialog also lets you set shot properties.

Note that the default values for some R3D shot properties are set using the configuration file *Clip.prefs* (see below).

Library View

If the library columns are not present, you will need to insert them manually.

Insert the R3D specific library columns by *right-clicking* on the library header row and choosing to insert the desired column :



Insert R3D columns :

....

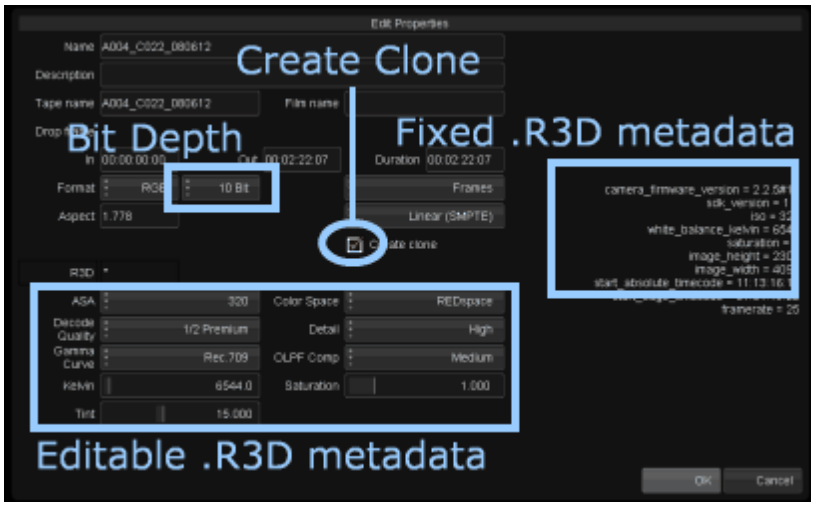
...

You can also use *Insert Metadata* to add a column that displays all the R3D metadata in a single instance (this is the same data as shown in the *Properties* dialog described below.

For more detail on tables and their use, see the Tables section.

Shot Properties

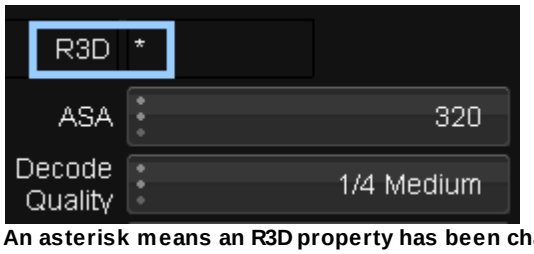
You can also view the properties of a single shot, and **set** these properties (for *single* or *multiple* shots), using the *Properties* button in the application library. With an R3D shot selected, press the *..Properties* button :



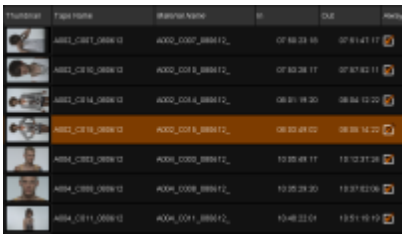
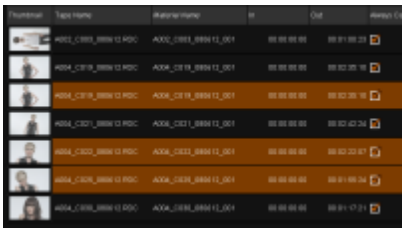
R3D Properties Window

Only the properties you *modify* will be set (saved). This is also true when you select *multiple* shots.

If a property is changed, the property dialog will display an **asterisk** (*) beside the R3D label :



An asterisk means an R3D property has been changed

Single Shot	Multiple Shots
	
Select *one* R3D shot and press the ***..Properties*** button to view and modify the properties for the selected shot.	Select *multiple* R3D shots and press the ***..Properties*** button to modify the properties for **all** selected shots.

Clip.prefs File and Default Settings

Location :	`C:\Nucoda\2014_1\root\Clip.prefs`

The *Clip.prefs* file is created in the application ROOT folder and is used to store the default preference settings for *bit depth*, *cloning*, *quality*, *OLPF compensation* and *detail*.

The *Clip.prefs* file has a simple ASCII format :

```
clipPrefs
{
    R3D
    {
        extension "r3d"
        bitDepth "10bit"
        createClone true
        decodeQuality "1/2 Premium"
        olpfComp "Medium"
        ...
    }
}
```

R3D Properties

Bit Depth

Default :	10 bit
Set Via :	*Clip.prefs* file
Parameter :	`bitDepth`
Values :	`8bit, 10bit, 16bit`

RED R3D shots will be set to the given bit depth on load.

Create Clone

Default :	true
Set Via :	*Clip.prefs* file
Parameter :	`createClone`

This controls the proxying behaviour of R3D files.

With *Create Clone* **true** (default), every R3D shot will be transparently *cloned* (proxied) to DPX. **This clone will be treated as the source**.

This has performance advantages and eliminates the requirement to continually decode the source R3D files.

Note that if other R3D shot properties are *changed*, the shot clone (and any other caches) will need to be re-generated.

ASA

Default :	From R3D file

This is the speed of the "film" and its sensitivity to light. The value will match the *ASA* setting as applied by the camera operator.

Decode Quality

Default :	1/2 Premium
Set Via :	*Clip.prefs* file
Values :	Full Premium , 1/2 Premium , 1/2 Medium , 1/4 Medium , 1/8 Medium, 1/16 Medium

This is the decoded size and quality generated from the raw R3D shot data and used as a *source*.

Note that if you change the decode quality for an R3D shot, the reported width and height of the clip will update *dynamically* in the library. Any caches present will be **invalidated** and need to be regenerated.

OLPF Compensation

Default :	Medium
Values :	Off , Low , Medium , High
Set Via :	*Clip.prefs* file
Parameter :	`olpfComp`

OLPF Compensation compensates for the camera *low-pass filter* and has the effect of *sharpening* the image.

OLPF Compensation can be used on both ***Full*** and ***Half Premium*** modes.

OLPF Compensation Examples

Note that the results of *OLPF compensation* require viewing on a proper output display device. The following images show a very rough view of the sharpening effect.

normal

OLPF Medium - Diff Red

Normal

OLPF Medium - Diff Red

OLPF low

OLPF medium

OLPF high

Digital Vision *DVO Sharpen* will often give better results.

Detail

Default :	High
Values :	Low , Medium , High
Set Via :	*Clip.prefs* file
Parameter :	`detail`

This is detail extraction.

Detail is only used for ***Full Premium*** mode.

Detail Example

Normal

Diff Red showing areas affected by Detail setting

Kelvin

Default :	From R3D file

A measure of colour temperature, used here to represent *white balance.* The value will match the *Kelvin* setting as applied by the camera operator.

Color Space

Default :	REDspace
Values :	REDspace , Rec.709 , CameraRGB

Gamma Curve

Default :	From *Project Colour Scaling*
Values :	Linear , Rec.709 , REDspace , REDlog, PDlog685, PDlog985

PDlog685 (PDlog985) is a standard *linear* to *Cineon* log conversion with a white point at 685 (985). Although "standard" (Cineon style) conversions, you should test and exercise caution because the PDlog settings may have variable (*lesser*) **dynamic range** compared to normal REDlog.

Default

The default R3D *Gamma Curve* element will be assigned to match the project colour scaling.

The values map as follows :

Project Colour Scaling	R3D Gamma Curve
Linear (SMPTE)	Rec.709
Linear (CGR)	REDspace
Film Log	REDlog
Video Log	REDlog

Tint

Default :	From R3D file

Saturation

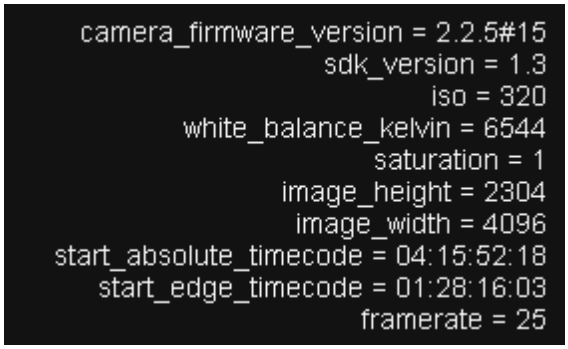
Default :	From R3D file

Exposure

Default :	From R3D file

Header Metadata

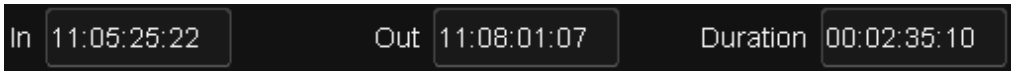
R3D header metadata is displayed on the right hand side of the *Properties* window. Many of the elements will record the original camera setup.



R3D Header Metadata

> Note that the header metadata includes a ***framerate*** element. This is the original frame rate used to record the shot and might be **different** to the current project or composition rate.

Timecodes



There are **two** timecodes embedded in the R3D file metadata. We consider one as the *primary (1st)* and one as the *secondary (2nd)*. The timecodes displayed in the properties window depend on which timecode we extract on file import. See Conforming with Red.

First Timecode

In the metadata, this is known as the *absolute* timecode.

Second Timecode

In the metadata, this is known as the *edge* timecode.

Conforming with RED

You can capture and conform R3D sequences in the usual way using an EDL. The settings required will depend on the type of EDL used and whether we match a tapename or clipname.

> A recent change to the RED ONE camera firmware (*build 16* and later) means that we now extract the conform *tapename/clipname* from the ***filename*** rather than the file header.

Avid Style EDL

The EDL format is as follows :

```
TITLE: Bedhead Main Conform
FCM: PAL
001 A006_C039_0806UL  V  C  07:31:07:07 07:31:07:20 ...
002 A006_C038_0806UU  V  C  07:28:17:02 07:28:17:19 ...
003 A006_C039_0806DV  V  C  07:31:19:02 07:31:19:16 ...
```

The EDL has a **full tapename** field that we can use for conforming.

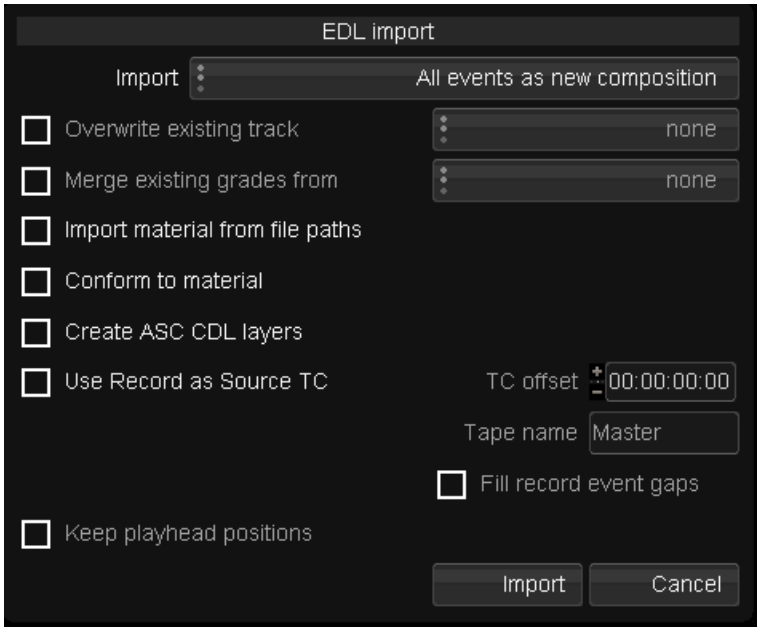
Avid EDL Tapename Field

The tapename field in this EDL is **16** characters long, exceeding the "legal" CMX3600 limit. This EDL can be created on an Avid system using the Avid *EDL Manager* application and the *Red16* EDL template [1]. This process is described in the Avid Red workflow document [2].

[1] *Red16* template : http://www.staticpictures.com/metacheater
[2] Avid Red workflow : http://www.avid.com/red/

Import EDL

From the Library, use the ***..Import*** button to open the file browser and load the EDL. The EDL options dialog will open :



EDL Import Options

> Make sure your EDL is the **same frame rate** as your project or conform will not work.

Here, we import *All events as new composition* and press the ***Import*** button. A composition is created and set as our ***Current Edit*** in the library, and the EDL events appear on our timeline.

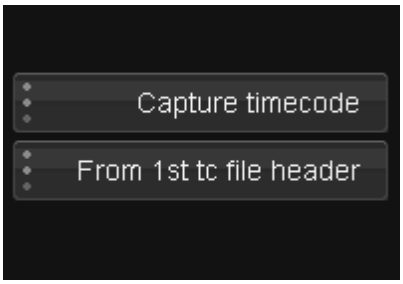
List Capture

From the Library, press the ***List Capture*** button. All the events will show as *Needed* until we capture and conform.

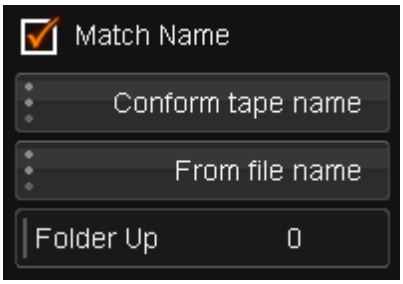
List Capture

Index	Status	Name	Tape Name	*Clip Name*	Src In	Src Out
000	Needed	A001_C026_0806UH.[628240-628253]	A001_C026_0806UH		06:58:49:15	06:58:50:03
001	Needed	A001_C026_0806UH.[628300-628315]	A001_C026_0806UH		06:58:52:00	06:58:52:15
002	Needed	A001_C026_0806UH.[628391-628403]	A001_C026_0806UH		06:58:55:16	06:58:56:03
003	Needed	A001_C026_0806UH.[628470-628483]	A001_C026_0806UH		06:58:58:20	06:58:59:08
004	Needed	A001_C026_0806UH.[628795-628808]	A001_C026_0806UH		06:59:11:20	06:59:12:08
005	Needed	A005_C011_0806DL.[394445-394459]	A005_C011_0806DL		04:22:57:20	04:22:58:09

The R3D file header contains two timecodes. We consider the **first** to be *primary* and use settings :



Take the **timecode** from the *first* header timecode (1st tc).



Take the **tapename** from the *filename* at level 0 (See the Appendix Automatic Naming).

Press the ***..Capture*** button and navigate to the top-level folder from which to start our search for the required R3D files. The folders will be recursively scanned for R3D files that match the list of events according to the conform criteria.

Once scanning is complete, the event list ***Status*** field should update :

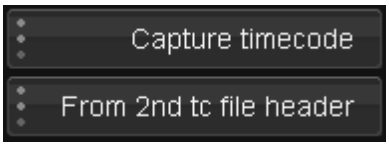
List Capture

Index	Status	Name	Tape Name	*Clip Name*	Src In	Src Out
000	Found	A001_C026_0806UH.[628240-628253]	A001_C026_0806UH		06:58:49:15	06:58:50:03
001	Found	A001_C026_0806UH.[628300-628315]	A001_C026_0806UH		06:58:52:00	06:58:52:15
002	Found	A001_C026_0806UH.[628391-628403]	A001_C026_0806UH		06:58:55:16	06:58:56:03
003	Found	A001_C026_0806UH.[628470-628483]	A001_C026_0806UH		06:58:58:20	06:58:59:08
004	Found	A001_C026_0806UH.[628795-628808]	A001_C026_0806UH		06:59:11:20	06:59:12:08
005	Found	A005_C011_0806DL.[394445-394459]	A005_C011_0806DL		04:22:57:20	04:22:58:09

The ***Material*** column will also update to reflect the path to the linked shot. To complete the process, press the ***Conform*** button :

Using the Second Timecode

If some shots are **not** found (i.e. remain *Needed*), we should change our settings and try using the *secondary* timecode :



and ***..Capture*** again.

Back in our timeline view, we have our shots linked and visible on the timeline :

Note that once the shots are *conformed*, their status will change to ***Conformed***. The list *Status* changes :

If we end up with a *partial capture* after the ***..Capture*** stage (some shots still in *Needed* state), then it is best practice to **conform** the *Found* shots before undertaking another capture step.

CMX Style with Clip Names

This EDL format will be similar to the following :

```
TITLE: Bedhead Main Conform
FCM: PAL
005 A004_C02   V   C    11:18:20:09 11:18:20:18 ...
* FROM CLIP NAME: A004_C025_0806UL
006 A004_C02   V   C    11:17:06:03 11:17:06:23 ...
* FROM CLIP NAME: A004_C024_0806UU
007 A002_C00   V   C    07:51:26:17 07:51:27:03 ...
* FROM CLIP NAME: A002_C007_0806EB
```

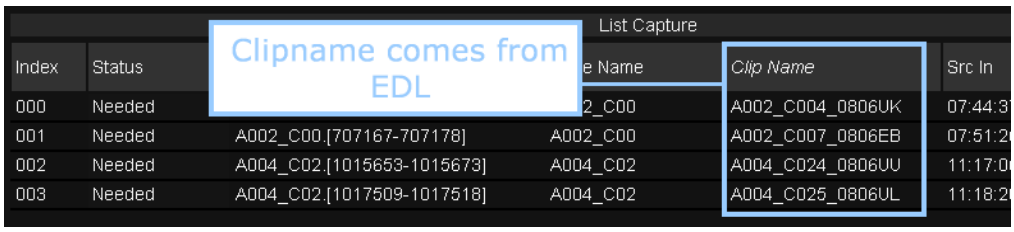
Note that the EDL tapename field is *truncated:* an underscore added and a character dropped i.e. **A004_C025** becomes **A004_C02**.

We use the *clip name* comment components to do the conform. Load the EDL the same way as the Avid style EDL above.

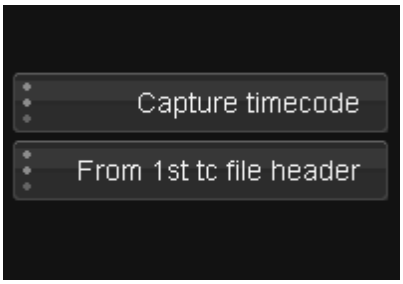
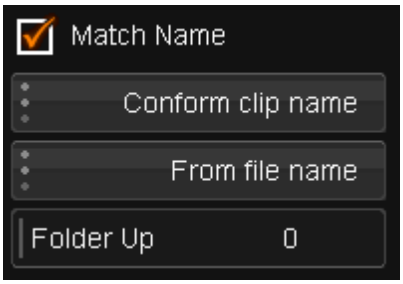
List Capture

From the Library, press the ***List Capture*** button.

Note that the *List Capture* list includes a **populated** ***Clip Name*** field (from EDL) :



The list *Clip Name* field is taken from the EDL "FROM CLIP NAME" parameter.

	
Take the **timecode** from the *first* header timecode (1st tc).	Take the **clipname** from the *filename* at level 0 (See the Appendix Automatic Naming).

The remaining steps are as per the Avid style EDL above.

Final Cut Style

```
TITLE: Bedhead Main Conform
FCM: PAL
005 A004C025   V   C    11:18:20:09 11:18:20:18 ...
* FROM CLIP NAME: A004_C025_0806UL
FINAL CUT PRO REEL: A004_C025_080612 REPLACED BY: A004C025
006 A004C024   V   C    11:17:06:03 11:17:06:23 ...
* FROM CLIP NAME: A004_C024_0806UU
FINAL CUT PRO REEL: A004_C024_080612 REPLACED BY: A004C024
007 A002C007   V   C    07:51:26:17 07:51:27:03 ...
* FROM CLIP NAME: A002_C007_0806EB
FINAL CUT PRO REEL: A002_C007_080612 REPLACED BY: A002C007
008 A002C004   V   C    07:44:37:13 07:44:38:03 ...
* FROM CLIP NAME: A002_C004_0806UK
FINAL CUT PRO REEL: A002_C004_080612 REPLACED BY: A002C004
```

This EDL is very similar to the CMX style with clipnames above. We will use the line :

```
* FROM CLIP NAME:  A002_C004_0806UK
```

to conform from *clipname* as described previously.

EDL Formatting

The EDL "FROM CLIP NAME" lines need to be formatted such that our parser can extract the correct name automatically with no confusion.

This means that the "FROM CLIP NAME" line must **not** include *extra* characters, extensions, comments or words. It should be the clipname as we would extract from the filename (path) itself.

The following EDL formats will **not work** :

```
* FROM CLIP NAME: A002_C007_080612_M.MOV

* FROM CLIP NAME: A002_C007_0806UL_M.MOV *
COMMENT:

* FROM CLIP NAME: A002_C010_080703_M-FRUIT
WHATEVER 422
```

It is usually straightforward to remove such extraneous content using a *text editor* and search/replace (replacing with nothing).

Workflows

In general, Red R3D files can be treated like any other file format inside the application with the proviso that they :

- Are often larger
- Require decoding (which can be realtime)
- Can be switched to a different resolution dynamically

Switching the decode quality can be an efficient way to save time and improve workflow. Using *1/4 Medium* (the default) can be useful during any conform checks while *1/2 Premium* is better for grading.

Avid ALE

Load the R3D shots and perform some basic sanity checks on the shots on a timeline. You can easily add many metadata properties to each shot, including metadata items such as :

- Scene
- Take
- Director
- DoP etc.

This metadata can be encoded and *exported* as an ALE List file for import and processing in an Avid system.

Basic Quality Assurance

The R3D rushes can be loaded into an application such as Nucoda Compose or Nucoda Fuse and viewed at 1/4 Medium quality for initial QA. Our project *output format* can be set to **SD** and a "fit" mode.

The sequence can be conformed via EDL (see Conforming with Red).

We need to check that each shot is the desired resolution and adjust as

required.

> It is possible for R3D shots to be shot at a *differing* resolutions. In this case, we would want to adjust the *properties* for this shot and change its **decode quality** parameter such that its pixel resolution matches the shots around it.

Once fully checked, we can export the timeline as *Quicktime* or *MXF* or any other format for use in an *Avid* or *Apple Final Cut Pro.*

Pre-Grade Caching or DPX Generation

As above, the R3D sequence can be conformed from an EDL and some basic quality checks performed.

Our project output format may be set at an R3D 2K format (i.e. 2048 x 1152) or a full 2K format (2048 x 1556) in "center" mode.

Initially, we can work at *1/4 Medium* quality mode, and using an offline version loaded onto a second video track, we can check :

- Shot resolutions match
- Edits match, and adjust (trim mode) if necessary
- Any pans, tilts or zooms match (and adjust as required)

Once complete, we can switch to *1/2 Premium* (2K) mode and export DPX frames of the sequence for use elsewhere.

Working with R3D Files

These are some hints at best practice when working with R3D files. Note that there is great flexibility in R3D metadata and the following notes are a general guide only.

Colour Space

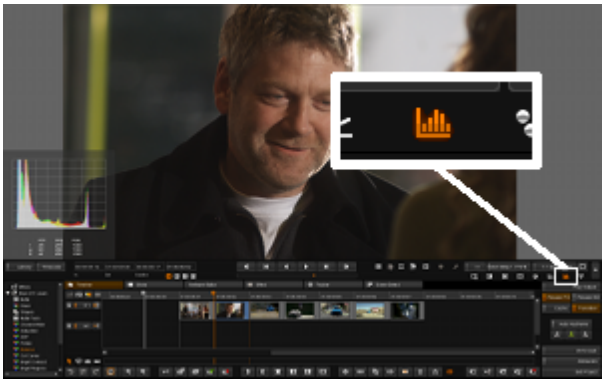
Set this to *REDSpace* (this is the default).

Gamma Curve

Set this to *REDlog* - the default if using a Log project.

With the *Colour Space* and *Gamma Curve* settings as above, you may want to check the application *histogram* output and ensure that your white levels are good and **no clipping** is taking place.

Check the display histogram via the **F11** hotkey or by pressing the *histogram* GUI button as shown below :



Histogram display and histogram button

OLPF

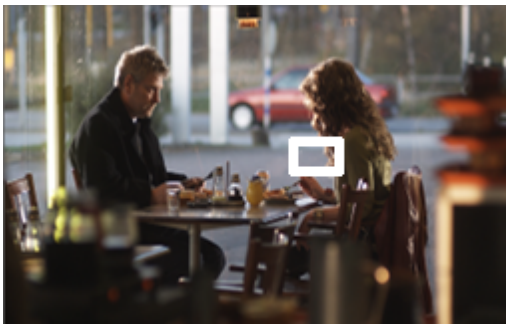
Turn OLPF filtering off and replace with *DVO Sharpen*. See below.

Kelvin

If the *Kelvin* value is **low** (e.g. 3200) you may want (or need) to use *DVO Grain* to improve image quality.

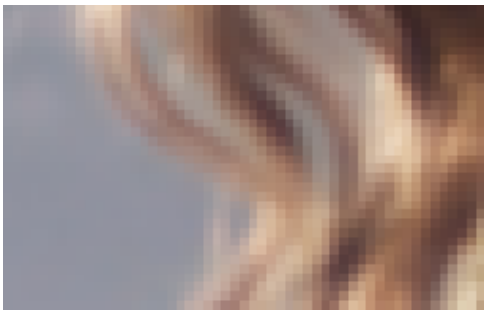
Half Premium 2K vs ZOM 2K Resize

The following images display the quality difference between the *Half Premium* decode of a 4K Full Premium shot, and the *ZOM filter resize* of the Full Premium 4K to 2K.



Full Size Image with Region of Interest

Higher quality can be observed using the ZOM filter.



Half Premium decode of 4K to 2K

ZOM filter of 4K to 2K

Note that decoding *Full Premium* at **4K** requires **64 bit Windows**. See below.

OLPF versus DVO Sharpen Filtering

These examples use the ZOM filtered 2K shot and shows a higher quality result with the *DVO Sharpen* tool.

OLPF set to High

DVO Sharpen

Tips

Resolution Support

Full Premium (or greater) source support requires **64 bit Windows**.

Memory Usage

The RED SDK can use a lot of memory. Signs of memory may include :

- Memory allocation failures/warning (logs or CMD shell)
- Occasional *Missing Media* plates being displayed in the monitor.

32 Bit Windows

Set the application *Image Memory* to a smaller value.

Via the main application *Preferences/Rendering* section :

or via the main preference file *general.prefs* :

```
memoryImagePoolMaxMB 700
```

Try reducing this from the default (1024 MB) to **700 MB**.

Turn *Render BG* off :

64 Bit Windows

On 64 bit Windows, you should have a much greater memory headroom. This should allow you to set Image Memory to 3000 (assuming 4GB total RAM available) :

Bit Depth

For efficiency reasons (memory and processing), R3D files will be defaulted to using a bit depth of **10 bits**. This default can be changed (see the Properties and Metadata section).

Create Clone

The *Create Clone* property will default to **enabled** (see the Properties and Metadata section).

OLPF Compensation

This compensates for the camera *low-pass filter* and will sharpen the image. The default setting is taken from the *Clip.prefs* file (see Properties and Metadata).

The Digital Vision *DVO Sharpen* tool will give better results.

Command Line

24

2014.1

Command Line 24

The *Command Line Interface* (CLI) lets you run application commands without starting up the application interface (GUI). The CLI is therefore useful for automating tasks that do not require an operator to be present.

The CLI supports many of the operations that can be performed interactively using the GUI interface:

- Project Definition and Creation
- Composition Definition and Creation
- Importing Clips to the Library
- Adding a Version
- Splicing or Overwriting Clips to a Composition
- EDL Import and Conform
- Capturing and Conforming Material
- Generating Local Proxies
- Rendering a Composition via Export
- Rendering a Composition Cache
- Running Multiple Operations from a File
- Listing Project and Composition Information
- Counting and Adding Tracks to Existing Compositions
- Testing for a GUI Lock
- Project Format Specification

Be careful to **quote** any strings or paths you use on the command line. In particular, pay attention to any *spaces* in strings or paths or you will see syntax errors i.e.

The argument :

```
--format-spec C:\data files\specs\test.spec
```

Will give an error due to the space in the "data files" folder. Quote this to prevent the error :

```
--format-spec "C:\data files\specs\test.spec"
```

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Conventions

Required parameters are given in angled brackets <> i.e.

```
--format-spec <path>
```

Optional parameters are given in square brackets [] i.e.

```
--timecode-header [1|2]
```

Possible values are separated with a vertical bar (| as above).

Splitting Long Lines

This document sometimes splits long command lines over multiple lines to make the command easier to read. The split if delimited by a *line-continuation character* "\" i.e.

```
--export S:\exp\$o\$c..dpx \
  --export-mode single
```

In reality, you would type the above command on a **single line only** *without* the continuation character :

```
--export S:\exp\$o\$c..dpx --export-mode single
```

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User Login

--user <username>	Log in as named user

To use the command line interface as a specific user, use the `--user` option and specify the username to login to the application as.

Command :

```
$ nucoda_film_master --user steven --list
Projects:
  1: test1               - C:\Nucoda\...
  2: Check Danger 002    - C:\Nucoda\...
  3: Check Danger 003    - C:\Nucoda\...
```

Without the `--user` option, the *last* user we logged in as is used. If we

Creating a Project

--project <name>	Create a new project with the specified name
--format-spec <path>	Use the specified project format specification template

Create a New Project

```
--project <name>
--format-spec <path>
```

To create a new project from the command line, create a *project format specification* file that describes the project. This is the equivalent of setting up the project configuration settings in the GUI.

Specify the *name* of the project and its *format specification file* using the command:

Command :

```
$ film_master --project PROJ1 --format-spec H:\specs\hd-
INFO Creating new project "PROJ1".
```

The above command creates a new project "PROJ1" using the definition stored in the file "hd-1.txt".

Project Format Specification

```
--format-spec <path>
```

This "format spec" is a **text file** that defines the elements of the project,

including both outputs and sources. The *output* and *source* sections are specified using the section tags:

- [output]
- [source]

The basic format is as follows :

```
<Global Parameters>
[output]
<output sections>
[source]
<source sections>
```

Some global parameters are required
There must be **one or more** *output* sections.
The **first** output section will be the *master* format for the project.
There are zero or more *source* sections (a "1:1 source" will always be created).
The '#' symbol starts a comment

See : Format Specification definition section

A minimal format specification file would look like:

```
# A minimum basic format specification
colourScaling=cgr

[output]
width=1920
height=1080
fps=25
aspectRatio=16/9
```

A "#" symbol starts a comment.

See the next section for the complete file format definition.

Example format specification files can be found in the folder :

```
C:\Nucoda\2014_1example_files\format_specs\
```

Project Format Specification

A project is defined using a *project format specification* file. This file is of the following format :

```
<Global Parameters>
# one or more output sections
[output]
key=value
...
# zero or more source sections
[source]
key=value
...
```

Data Types

The various data types we can use in the specification are as shown in the table below.

Data Type	Description	Examples
<bool>	A boolean true/false	true, false
<int>	Integer number	1556
<float>	Floating point number	29.97

Global Parameters

These parameters appear **outside** an *output* or *source* section, at the start of the file. We underline required options.

colourScaling

Required

Values : `SMPTE CGR FilmLog VideoLog`

Default :

Project colour scaling mode.

outputClip

Values : `<bool>`

Default : false

Project output clipping.

Output Section Parameters

These parameters appear inside an *output* section.

width

Required

Values : `<int>`

Default :

The width (x resolution)of the output format in pixels.

height

Required

Values : `<int>`

Default :

The height (y resolution)of the output format in pixels.

fps

Required

Values : `<float>`

Default :

The frames per second. If no decimal point set, we add a .0 automatically e.g. 29.97, 25

aspectRatio

Required

Values : `<int>/<int>`

Default :

The output format image aspect ratio. Specify as M/N e.g. 1316/1000

dropFrame

Values : `<bool>`

Default : false

Set if output format is drop-frame.

videoOutput

Values : `<bool>`

Default : false

Specifies if Video Output is enabled on output format.

fields

Values : `f2:f1 f1:f2 frames`

Default : `frames`

Specifies if output format is field based and gives field order.

channels

Values : `RGB RGBA`

Default : `RGB`

Colour channels

bitDepth

Values : `8,10,16,half`

Default : `10`

Output colour depth per colour channel, in bits per pixel.

convertMode

Values : `none fit crop center`

Default : `none`

Output format conversion from source.

convertFilter

Values : `none box bilinear gaussian zom lanczos`

Default : `zom`

What conversion filter to use on the source (if *convertMode* not "none")

applyCms

Values : `<bool>`

Default : false

Specifies if the *Apply CMS* toggle is on or off.

Source Section Parameters

These parameters appear inside an *input* section.

scale

Required

Values : `<int>`

Default :

Sets the scale of the source/proxy. This integer will divide the width and height to set the proxy size. A scale N gives an "N:1" proxy.

bitDepth

As output section above.

convertFilter

As output section above.
Only applicable if scale > 1.

Notes

- The *key* values are **case-sensitive**.
- *Values* are **case-insensitive** (e.g. use "rgb" or "RGB").

Attach and Detach Project

`--attach-project <path>`	Attach project found at specified path
`--detach-project <name>`	Detach named project
`--remove-cache`	delete project caches when attaching

Attaching a project makes it available for use by the application and adds it to the list of available projects on the project screen.

Attaching a Project

`--attach-project <path>`

This command *attaches* the specified project. The named project is the full path to the project folder.

Command :

```
$ nucoda_film_master \
  --attach-project D:\archived\project-x
INFO Imported "D:\archived\project-x" (project name is "project-x").
```

Attach multiple projects by separating them with a space e.g.

```
--attach-project D:\project1 "G:\blue sky"
```

Detaching a Project

`--detach-project <name>`

This command *detaches* the named project.

Command :

```
$ nucoda_film_master --detach-project project-x
INFO Detached project "project-x".
```

Removing Project Caches

`--remove-cache`

When attaching projects, specify this argument to have their caches removed after attachment.

Command :

```
$ nucoda_film_master \
  --attach-project D:\archived\project-x \
  --remove-cache
INFO Imported "D:\archived\project-x" \
  (project name is "project-x") and removed cache.
```

Creating a Composition

`--composition <name>`	Name and create a new composition
`--num-tracks <N>`	Create a composition with N video tracks

Create a New Composition

`--composition <name>`

The following command creates a new composition named "COMP1" inside project "PROJ1".

Command :

```
$ film_master --project PROJ1 --composition COMP1
INFO Opening project "PROJ1".
INFO Creating new composition "COMP1".
```

If the project does not exist, it will be created. This will require a *format specification* option.

Create a New Project and New Composition

The following command creates a new project "PROJ2" according to the format specification file "FORMAT". It will then create a new composition named "COMP2" inside the newly created project.

Command :

```
$ film_master --project PROJ2 --format-spec FORMAT \
--composition COMP2
INFO Creating new project "PROJ2".
INFO Creating new composition "COMP2".
```

Create a New Composition with Multiple Video Tracks

`--num-tracks <N>`

The following command creates a new composition "COMP3" containing **3 video tracks** (V1,V2 and V3) inside project "PROJ1".

Command :

```
$ film_master --project PROJ1 --composition COMP3 \
--num-tracks 3
INFO Opening project "PROJ1".
INFO Creating new composition "COMP3".
```

Video tracks can be selected using the `--track ID` option on the command line, where ID is "V1", "V2" etc.

Importing Clips

`--import-clip <path>`	Import clip from specified path
`--name <name>`	Give the clip a library name on import
`--description <descr>` **`--clip-description <descr>`**	Give the clip a library description on import

Importing a Clip

`--import-clip <path>`

The following command imports a clip from the specified path into the library of project "PROJ1":

Command :

```
$ film_master --project PROJ1 --import-clip \
  M:\images\train\300001.dpx
INFO Opening project "PROJ1".
INFO Found range (300000, 300164).
```

The clip imported above will be given a default name in this case because the filename is numeric only.

The default name will be taken from the two containing directories i.e. "images train". See below.

Command :

```
$ film_master --project PROJ1 \
  --import-clip Z:\shots\056\056_001.001.dpx
INFO Opening project "PROJ1".
INFO Found range (1, 15).
```

The clip will be given a name taken from the filename, i.e. "056_001". See below.

This command only imports one clip. To import multiple clips, see Importing Folders.

If you perform the same import operation *twice*, the clip will be imported **again**. This differs from previous behaviour that expected the option `--force-import` to be used (this option has been removed).

Specifying a Clip Name on Import

`--name <name>`

To specify a clip name in the library on import, use the `--name` option.

Command :

```
$ film_master --project PROJ1 \
  --import-clip Z:\shots\002\shot1002.001.dpx \
  --name "clip name"
INFO Opening project "PROJ1".
INFO Found range (1, 99).
INFO Set clip name to "clip name".
```

You can only set the name of an imported clip when you import it, not afterwards.

Clip Naming Convention

Unless specified with the `--name` option, the imported clip is named as per the settings in the application preferences Auto Assign Name.

Specifying a Clip Description on Import

`--description <description>`

To specify a clip description in the library on import, use the `--description` option.

Command :

```
$ film_master --project PROJ1 --import-clip \
  Z:\shots\1002\shot1002.001.dpx \
  --description "clip desc"
INFO Opening project "PROJ1".
INFO Found range (1, 99).
INFO Set clip description to "clip desc".
```

The description can only be set on import, not afterwards.

Importing Movies

`--import-movie <path>`	Import a movie clip from specified path

Importing a Movie

`--import-movie <path>`

This command imports a movie into the named project from the specified path.

Any supported movie format can be imported using this command, including :

- Red R3D
- Quicktime
- MXF wrapped media
- ARRI D21
- Silicon Imaging SI-2K
- Vision Research Phantom

Command :

```
$ film_master --project PROJ1 --composition comp1 \
  --import-movie C:\media\qt\sample.mov
INFO Opening project "PROJ1".
INFO Opening composition "comp1".
```

Importing Folders

--import-folder <path>	Import clips found in named folder (and all sub-folders)
--filter-format <fmt>	Filter clips we import by file format
--filter-res <w> <h>	Filter clips we import by image resolution
--splice-order <file|timecode>	Splice clips found to composition in specified order
--timecode-header [1|2]	Take timecodes from file headers
--timecode-filename	Take timecodes from file names/paths
--tapename-header	Take tapenames from file headers
--tapename-filename <level>	Take tapenames from file names/paths

These options control the import of supported image sequences recursively from a specified folder path.

Importing a Folder

`--import-folder <start folder path>`

This command imports **all supported image files** found in the specified folder and any sub-folders (recursively).

Command :

```
$ film_master --project code2 \
  --import-folder Z:\scans\reel4\
INFO Opening project "code2" from ...
INFO Batch ... importing directory 0 of 1 (0)
INFO Batch ... importing directory 1 of 5 (20)
...
INFO Batch Import (completed) ... 6 of 6 (100)
```

The command shown above has imported the given folder into the specified project "code2". This is a total of **six** folders searched, the specified folder itself and five sub-folders :

- `z:\scans\reel4\`
- `z:\scans\reel4\0008H\`
- `z:\scans\reel4\0006\`
- `z:\scans\reel4\0005\`
- `z:\scans\reel4\0002\`
- `z:\scans\reel4\0002\high\`

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Filtering

We can filter the sequences the command selects to import on image resolution (e.g. choose only HD sequences) and image format (e.g. choose only TIFF sequences).

Filter on Resolution

```
--filter-res <width> <height>
```

This option will select only images that match the given resolution (width x height) in pixels.

Command :

```
$ film_master --project code2 \
  --import-folder z:\scans\reel4\ \
  --filter-res 2048 1556
INFO Opening project "code2" from ...
INFO Batch ... importing directory 0 of 1 (0)
INFO Batch ... importing directory 1 of 5 (20)
...
...
INFO Batch Import (completed) ... 6 of 6 (100)
```

Shots that match the resolution specified will be loaded into the project library.

Filter on Image Format

```
--filter-format <extension>
```

This option will select only image sequences that match the specified file format, given as the common format extension.

Command :

```
$ film_master --project code2 \
  --import-folder z:\scans\reel4\ \
  --filter-format dpx
```

For a list of supported formats and recognised extensions, see File Format Support.

Tapename

```
--tapename-header
--tapename-filename <level>
```

These options override the source of the *tapename* field we extract when importing each sequence found.

If you do not specify these options, the default settings will be used as set up in your preferences.

Command :

```
$ film_master --project code2 \
  --import-folder z:\scans\reel4\ \
  --filter-format tif --tapename-filename 1
INFO Opening project "code2" from ...
INFO Batch ... importing directory 0 of 1 (0)
INFO Batch ... importing directory 1 of 5 (20)
...
...
INFO Batch Import (completed) ... 6 of 6 (100)
```

Timecode

`--timecode-header [1|2]`
`--timecode-filename`

These options override the source of the *timecode* we extract when importing each sequence found.

Using `--timecode-header` will attempt to extract the sequence timecode from the file *header*. If this does not exist (e.g. the format does not support header timecode), then the *filename* numerics are used to calculate the timecode.

If you do not specify these options, the default settings will be used as set up in your preferences.

First and Second Timecode

This is a Red R3D file specific option argument.

The `--timecode-header` option takes an **optional** argument 1 or 2. This allows us to specify whether to use the *first* or *second* timecode from an R3D file. **With no argument, we default to 1.**

Command :

```
$ film_master --project code2 \
  --import-folder z:\scans\episode5\ \
  --filter-format r3d --timecode-header 2
INFO Opening project "code2" from ...
INFO Batch ... importing directory 0 of 1 (0)
INFO Batch ... importing directory 1 of 5 (20)
...
...
INFO Batch Import (completed) ... 6 of 6 (100)
```

Splicing to a Composition

`--splice-order <file|timecode>`

This option imports the shots found from the folder import and also *splices* them to a named composition.

> The *composition* must be specified via the `--composition` option.

A splice *order (file* or *timecode*) is **required**

file

This splices the found shots to the timeline in the order they are *found*.

> Note that shots are currently spliced from timecode 00:00:00:00.

timecode

This splices the shots to the timeline in their *timecode* order.

Command :

```
$ film_master --project code2 --composition comp1 \
  --import-folder z:\scans\episode5\ \
  --filter-format dpx --splice-order timecode
INFO Opening project "code2" from ...
INFO Opening composition "comp1".
```

Adding a Version

`--add-version <path>`	Add a new version of a clip to the composition

Adding a Clip Version

`--add-version <path>`

To add a version to a composition clip, use the `--add-version` command.

Command :

```
$ film_master --project PROJ1 --composition COMP1 \
  --add-version M:\images\shots\009\056_009.001.dpx \
  --clip-name VERSION2 --record-in 100

INFO Opening project "PROJ1".

INFO Opening composition "COMP1".
INFO Found range (1, 54).
INFO Set clip name to "VERSION2".
INFO Clip added to composition.
```

This will import the clip at the specified path (giving it a name "VERSION2"), setting it as a version of the clip at the record position 100.

You need to have at least the same amount of source material in the new version as the old or an error will occur.

Replacing a Source

--replace-source <path>	Replace source of shot (at frame count) specified by new source

Replacing a Clip Source

`--replace-source <path>`

To replace the source of the shot (at specified record-in count) with the new source as specified in the given path.

Command :

```
$ film_master --project PROJ1 --composition COMP1 \
  --replace-source M:\images\shots\009\056_009.001.dpx \
  --record-in 100

INFO Opening project "PROJ1".

INFO Opening composition "COMP1".
INFO Found range (1, 54).
INFO Set clip name to "VERSION2".
INFO Clip added to composition.
```

The source will be replaced.

Grades will be **retained** on the shot.

You need to have at least the same amount of source material in the new version as the old or an error will occur.

Splice and Overwrite Clips

--splice [path]	Splice a clip to the composition timeline If clip path not given, clip **name** must be.
--overwrite [path]	Overwrite a clip to the composition timeline. If clip path not given, clip **name** must be.
--record-in <N>	Composition timeline record position
--source-in <N>	Input clip source position offset
--name <name>	Select name of library clip to operate on
--length <N>	Consider only this number of input frames
--track <Vn>	Select video track to operate on

Splice versus Overwrite

- A **splice** operation will push any existing clip frames up the timeline from the splice location.
- An **overwrite** operation will overwrite any existing clip frames from the splice location.

If a clip file *path* is not supplied, it is **required** to supply a clip *name* (`--name`). If you only supply a clip name, it must *exist* in the project library.

Note that the timeline is assumed to start at 00:00:00:00.
Clips will be placed at the end of the timeline (or 00:00:00:00 if timeline empty) unless a record-in point is set with the `--record-in` option.

Original "alex one" clip (splice to empty composition)

Command :

```
$ nucoda_fuse --project PROJ1 --composition COMP1 \
  --name "alex one" \
  --splice
```

Result:

If we now :

Splice Clip

Command :

```
$ nucoda_fuse --project PROJ1 --composition COMP1 \
  --name "train" \
  --splice --record-in 0
```

We end up with :

Overwrite Clip

Command :

```
$ nucoda_fuse --project PROJ1 --composition COMP1 \
  --name "train" \
  --overwrite --record-in 0
```

We end up with :

It is best to always set the explicit in point for an *overwrite* operation using the `--record-in` option.

Splice/Overwrite By Clip Name

Command :

```
$ nucoda_fuse --project PROJ1 --composition COMP1 \
  --name "train" --splice
INFO Opening project "PROJ1".
INFO Opening composition "COMP1".
INFO Clip added to composition.
```

Splice/Overwrite By Clip Path

This will do an import to library followed by a splice.

Command :

```
$ nucoda_fuse --project PROJ1 --composition COMP1 \
  --splice M:\shots\004\300000.dpx
INFO Opening project "PROJ1".
INFO Opening composition "COMP1".
INFO Found range (300000, 300164).
INFO Clip added to composition.
```

You might want to give the imported clip a library name and description (possible on first import only).

Command :

```
$ nucoda_fuse --project PROJ1 --composition COMP1 \
  --splice Z:\images\300000.dpx --name "train" \
  --description "this is a train clip"
INFO Opening project "PROJ1".
INFO Opening composition "COMP1".
INFO Found range (300000, 300164).
INFO Set clip name to "train".
INFO Set clip description to "this is a train clip".
INFO Clip added to composition.
```

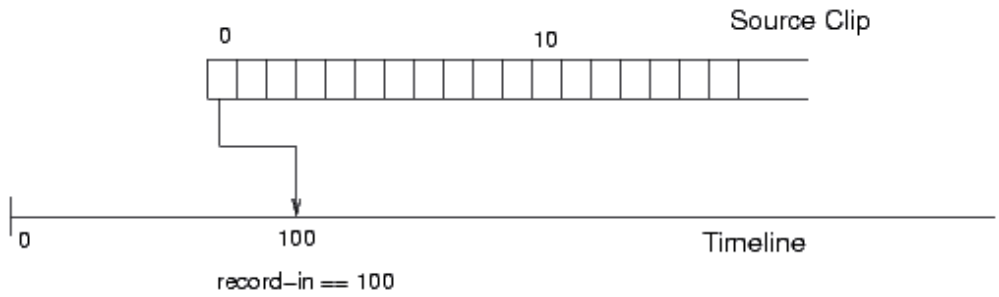
Splice/Overwrite to a Different Video Track

If the composition has more than one video track, we can select the target track using the `--track` option.

Command :

```
$ nucoda_fuse --project PROJ1 --composition COMP1 \
  --splice --name "train" --track V2
INFO Opening project "PROJ1".
INFO Opening composition "COMP1".
INFO Clip added to composition.
```

Splice/Overwrite to a Specific Record Position



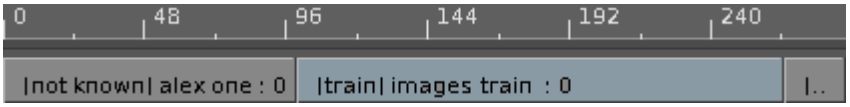
We can splice or overwrite to a specific position on the composition timeline using the option `--record-in`.

Original timeline video track with clip "alex one":

Command :

```
$ nucoda_fuse --project PROJ1 --composition COMP1 \
  --overwrite --name "train" --record-in 100
INFO Opening project "PROJ1".
INFO Opening composition "COMP1".
INFO Clip added to composition.
```

After overwrite to frame 100 of clip "train"



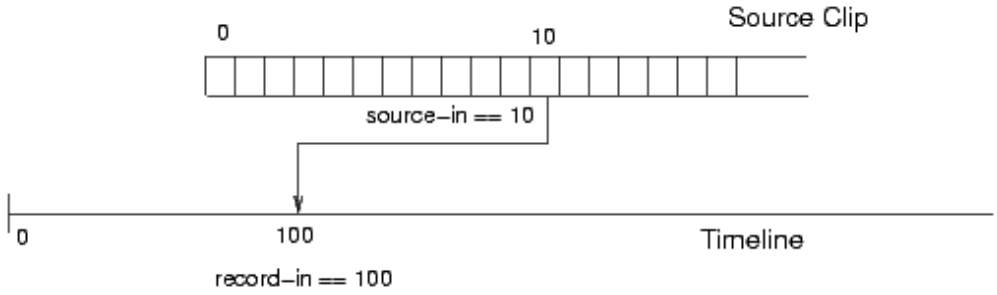
Splice/Overwrite from a Specific Source Position

There are two methods to splice or overwrite a clip from a specific *source* position. Explicitly using the `--source-in` option or implicitly using the timecode of the *frame* of the clip we pass in.

The second implicit method needs the full path of the clip frame to be used not the clip name.

Source-In

We can splice/overwrite from a specific **source** position by using the option `--source-in :`



Command :

```
$ nucoda_fuse --project PROJ1 --composition COMP1 \
  --overwrite --name "slate" \
  --record-in 100 --source-in 10
INFO Opening project "PROJ1".
INFO Opening composition "COMP1".
INFO Clip added to composition.
```

Clip Frame

Instead of using the `--source-in` option to select the first frame of the source to splice, we splice the source clip from the frame we pass in.

If we have a clip :

`008[200-300].dpx`

The following command :

Command :

```
$ nucoda_fuse --project PROJ1 --composition COMP1 \
  --splice Z:\images\008220.dpx
  --record-in 100
INFO Opening project "PROJ1".
INFO Opening composition "COMP1".
INFO Clip added to composition.
```

will splice the clip from frame `008220.dpx` i.e. splicing frames `008[220-300].dpx`.

This is equivalent to using the option `--source-in 8220`.

Splice/Overwrite of Particular Material Lengths

We can choose to splice or overwrite a particular length of clip using the `--length`. The following command will splice in the first 10 frames (`--length`) of clip "slate" onto the timeline at frame 100 (`--record-in`).

Command :

```
$ nucoda_fuse --project PROJ1 --composition COMP1 \
  --splice --name "slate" \
  --record-in 100 --length 10
INFO Opening project "PROJ1".
INFO Opening composition "COMP1".
INFO Clip added to composition.
```

Applying a Note to a Shot

--set-note <name|path>	Apply note to shot we splice (or overwrite). Note can be specified by name or path.

Apply Note

Use the `--set-note` command to apply a note to a shot.

The note can **only** be applied when the shot is *spliced* or *overwritten* to the composition. See : Splice and Overwrite Clips

By Name

`--set-note NAME`

Apply the named note to the shot. The note must exist in the project notes folder :

The named note must exist in the specified project.

Command :

```
$ film_master --project PROJ1 \
  --composition comp --name SHOT \
  --splice --record-in 90673 \
  --set-note lowerlevels
INFO Opening project "PROJ1".
INFO Opening project "PROJ1" from "D:\Nucoda\2013_1\proj
INFO Opening composition "comp".
Successfully applied note lowerlevels.
INFO Clip added to composition.
```

By Path

`--set-note PATH`

Apply the note found at the given path to the shot.

Command :

```
$ film_master --project PROJ1 \
  --composition comp --name SHOT \
  --overwrite --record-in 90673 \
  --set-note S:\Temp\lowerlevels.note
INFO Opening project "PROJ1".
INFO Opening project "PROJ1" from "D:\Nucoda\2013_1\proj
INFO Opening composition "comp".
Successfully applied note s:\Temp\lowerlevels.note.
INFO Clip added to composition.
```

EDL Import and Conform

--import-edl <path>	Import EDL or AAF from given path
--new **--add** **--mark**	**Required** (one of) **--new** : Create a new composition **--add** : Operate on existing composition **--mark** : Mark existing composition

Additional Options :

--track-type <v|a|l|r|m>	Specify video, audio, left, right or mono track **Default :** v
--merge-from N	After import, merge grades from track number N **Requires :** --match
--match <source|record|clip>	When merging grades using `--merge-from`, specify what to match when merging : source timecode, record timecode or clip name
--track-target N	Specify target track number N
--import-material	Import EDL or AAF referenced material
--conform-material	Conform material to composition
--autoconform	Import and conform EDL or AAF referenced material in one step
--conform-record-tc	Conform to *record* timecode (default is source timecode)
--no-translate	Do not use any EDL tapename translation table
--strip-extension	Strip clip name extensions (e.g. .mov etc.)
--lut-layers	Import ASC LUT's and create a CDL base

	layer
--cdl-layers	Create an ASC CDL and CDL base layer

Note : track numbers are indexed from 1.

Use the `--help-import` option to the application to see some basic usage for the EDL import functionality.

Importing

`--import-edl <path> < --new | --add | --mark >`

To import an EDL or AAF list, use the `--import-edl` option with the *path* to the file.

Requirements :

- One of the options `--new`, `--add` or `--mark` is required to fully specify the operation. See below.

You can use `--import-edl` with AAF files but most other options in this chapter relate to EDL import only.

Creating a New Composition

`--import-edl <path>` **`--new`**

This imports the file and creates a **new** composition in the library with tracks created as required.

No media is imported or linked to a composition automatically. See the `--import-material` and *conform* options below.

Command :

```
$ nucoda_film_master --project "PROJ1" \
  --import-edl S:\edl\ttt.edl --new
INFO Opening project "PROJ1" from "D:\Nucoda\2014_1\proj
INFO ttt.edl imported.
```

Naming the Composition

By default, the composition name (*material name*) is taken from the EDL "TITLE:" line.

Use the `--name` option to name the composition created explicitly.

Command :

```
$ nucoda_film_master --project "PROJ1" \
  --import-edl S:\edl\ttt.edl --new \
  --name compname
INFO Opening project "PROJ1" from "D:\Nucoda\2014_1\proj
INFO ttt.edl imported.
```

Adding to an Existing Composition

`--import-edl <path>` **`--add`**

The **--add** option will import the named EDL and add it to the named composition.

Requirements :

- Name the composition we are operating on using the `--composition` option.

Command :

```
$ nucoda_film_master --project "PROJ1"
  --composition "compname" \
  --import-edl S:\edl\ttt-extra.edl --add
INFO Opening project "PROJ1" from "D:\Nucoda\2014_1\proj
INFO Opening composition "compname".
INFO ttt-extra.edl imported.
```

Target Track

`--track-target N`

Use this option to add the imported EDL to the specified track. If this option is not given, the EDL is added to the *next* available track (which will be created).

The imported EDL will *overwrite* the target track.

Marking an Existing Composition

`--import-edl <path>` **`--mark --track-target N`**

The `--mark` option imports the named EDL and places "marks" (*scene edits*) on the track specified. We place the edits on the target track as per the EDL **In/Out record timecode** (for each EDL event).

Requirements :

- The `--composition` option is required
- The `--track-target` option is required to specify the *target track* we mark

Command :

```
$ nucoda_film_master --project "PROJ1"
  --composition "compname" \
  --import-edl S:\edl\ttt-mark.edl \
  --mark --track-target 1
INFO Opening project "PROJ1" from "D:\Nucoda\2014_1\proj
INFO Opening composition "compname".
INFO ttt-mark.edl marked.
```

The target track must exist.

Importing Media and Conforming

```
--import-material
--conform-material
--autoconform
--conform-record-tc
```

Importing an EDL creates the basic composition but does not import or link media to the composition. The options described here import actual media to the project library and conform (link) it to the imported EDL.

These options work on `--import-edl only` and assume a command-line that includes :

```
--import-edl <path> < --new | --add | --mark >
```

Importing Media

`--import-material`

Imports any material referenced when importing the EDL.

Command :

```
$ nucoda_film_master --project "PROJ1" \
  --import-edl S:\edl\ttt.edl --new \
  --import-material
INFO Opening project "PROJ1" from "D:\Nucoda\2014_1\proj
INFO ttt.edl imported.
```

Material paths are specified per EDL event using a "FROM FILE" syntax as shown below :

```
TITLE: comptest
001  tape-1   V   C   05:04:46:13 05:04:56:03 01:03:16:04 01:0
* FROM FILE: S:\media\images\mazda-2k\OE5012A\438877.dpx
```

Each referenced clip is imported into the project library from the specified file path.

Conforming

`--conform-material`

Conform (link) any material referenced when importing the EDL. The material is assumed to be in the project library unless the option `--import-material` is also used.

Command :

```
$ nucoda_film_master --project "PROJ1" \
  --import-edl S:\edl\ttt.edl --new \
  --import-material --conform-material
INFO Opening project "PROJ1" from "D:\Nucoda\2014_1\proj
INFO ttt.edl imported.
```

Import and Conform in One Step

`--autoconform`

This will import EDL referenced material into the library and conform (link) it to the composition at the same time.

Command :

```
$ nucoda_film_master --project "PROJ1" \
  --import-edl S:\edl\ttt.edl --new \
  --autoconform
INFO Opening project "PROJ1" from "D:\Nucoda\2014_1\proj
INFO ttt.edl imported.
```

The `--autoconform` option is equivalent to :

```
--import-material --conform-material
```

Conforming to Record Timecode

`--conform-record-tc`

When conforming composition events, use the *record* timecode when doing the match.

Merging Grades

```
--merge-from < N | mixdown >
--match < source | record | clip >
```

Use these options to import and add a new EDL to an existing composition, preserving existing grades where shots match. You must specify the track you take the grades from and also how to match the shots (thus selecting the correct grades to merge over).

To ensure that any EDL referenced material is imported and conformed, you will also need to use some combination of the conform options above e.g. `--autoconform`

Requirements :

- The `--composition` option is required to specify the current composition we merge from.
- The `--match` option is required to specify how to match the shots.
- Use a conform option (e.g. `--autoconform`) to link referenced material.

Choosing Source Track

`--merge-from < N | mixdown >`

This selects the source track containing the grades to merge or "mixdown" to select the *mixed down* grades (the "sum" of the grades over all source tracks).

Match Method

`--match < source | record | clip >`

Required when using `--merge-from`.

This selects the method to use when *matching* shots when merging over the grades.

Name	Method
`source`	Match via *source* timecode
`record`	Match via *record* timecode
`clip`	Match using *clip name*

Command :

```
$ nucoda_film_master --project "PROJ1" \
  --composition compname \
  --import-edl S:\edl\ttt-merge.edl --add \
  --autoconform \
  --merge-from 1 \
  --match record
INFO Opening project "PROJ1" from "D:\Nucoda\2014_1\proj
INFO Opening composition "compname".
INFO ttt-merge.edl imported.
```

Other Options

Tapename Translation

`--no-translate`

This option disables the automatic tapename *translation* on import.

Some EDL files contain a *tapename translation table*. This table can be used to translate **illegal** tapenames (e.g. containing spaces) to legal ones (e.g. spaces replaced with underscores). Normally we use this translation table to create correct tapenames once imported.

We support two types of translation table : Avid and Final Cut Pro style.

Translation Table Type	EDL Line Pattern
Avid style :	`>>> SOURCE`
Final Cut pro style :	`FINAL CUT PRO REEL:`

Example

```
TITLE: comptest
001  tape_daily_10   V   C   05:04:46:13 05:04:56:03 01:0
* FROM FILE: S:\media\images\mazda-2k\OE5012A\438877.dpx
FINAL CUT PRO REEL: tape daily 10 REPLACED BY: tape_daily
```

Stripping Clipname Extensions

`--strip-extensions`

Remove file extensions on any EDL clipnames (e.g. .mov) before processing EDL.

LUT Layers

`--lut-layers`

If the EDL contains any ASC LUT definitions, this option will enable processing and creation of a CDL base layer.

CDL Layers

`--cdl-layers`

If the EDL contains any CDL (*Color Decision List*) definitions, this option will enable processing and creation of a CDL base layer.

Capturing and Conforming

--capture <path>	Capture material from top-level path specified
--capture-list	Print out the internal capture list created.
--match-name <0|1>	Whether to use tapename, clipname or filmname when conforming.
--exact-timecode	When capturing, expect source clips to match the EDL timecode **exactly**.
--conform	Link timeline to "Found" library clips
--handle-length <N>	Capture N handles

Capture versus Conform

Capture

Searches for source material in specified locations (*recursively*), trying to match items referenced in the EDL/AAF composition and pulling them into the library. In general, whole clips are captured if present (not just the event duration).

Conform

Links library items with the composition timeline (you may wish to use an EDL merely to load material into the library (*capture* only)).

A *conform* will always attempt to link the **latest** library material to the timeline. This means if a later version of a clip is imported or captured, the conform will link to this new version.

Loading the List

`--import <path>`

When we perform a capture operation on a list file created composition, we attempt to match the composition timeline (which reflect the list "events") to actual source material.

Consider the following EDL:

```
TITLE: Test EDL
001 721A V  C  01:51:25:07 01:51:25:22 01:05:00:00 01:05:00:15
002 722A V  C  02:37:04:21 02:37:06:12 01:05:00:15 01:05:02:06
003 721A V  C  01:52:27:09 01:52:28:13 01:05:02:06 01:05:03:10
004 722A V  C  02:38:05:16 02:38:06:19 01:05:03:10 01:05:04:13
```

Load an EDL using the following command :

Command :

```
$ film_master --project PROJ1 \
  --import C:\edls\test.edl
INFO Opening project "PROJ1".
INFO /edl/test.edl imported.
```

Results in the composition title "Test EDL" from the EDL "TITLE" parameter.

At this point, we will have a composition called "Test EDL" in the library.
Making it active would show us a timeline consisting of four clips (as per EDL) on a single video track.
These clips will be *Offline* if we view them using the application monitor.

Displaying the Capture List

`--capture-list`

With an EDL loaded, we can view its status using the `--capture-list` option :

Command :

```
$ film_master --project PROJ1 --composition "Test EDL" \
  --capture-list
INFO Opening project "PROJ1".
INFO Opening composition "Test EDL".
Clip                  | Start       | End         | Tape    | Status
----------------------+-------------+-------------+---------+----
 721A.[160447-160462] | 01:51:25:07 | 01:51:25:22 |    721A | Ready
 722A.[226197-226236] | 02:37:04:21 | 02:37:06:12 |    722A | Ready
 721A.[161937-161965] | 01:52:27:09 | 01:52:28:13 |    721A | Ready
 722A.[227656-227683] | 02:38:05:16 | 02:38:06:19 |    722A | Ready
```

This is our internal representation of the EDL and its current status "**Ready**".

Capturing

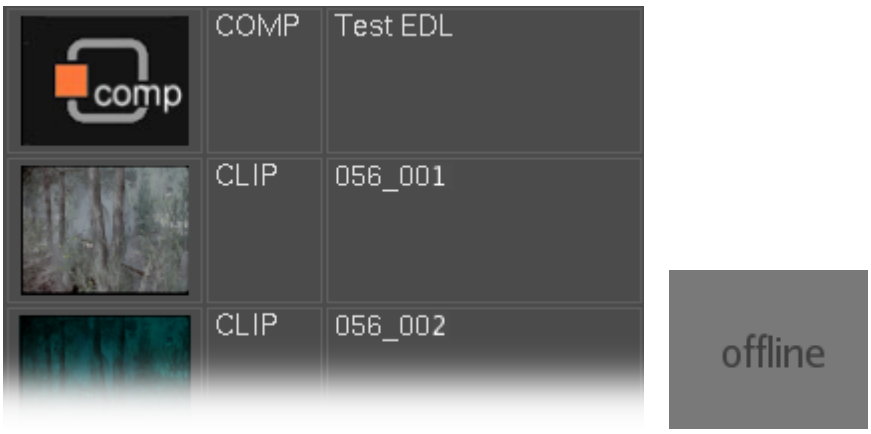
```
--capture <path>
--match-name <0|1>
--handle-length <N>
```

To perform the *capture*, use the `--capture` option, with an argument of a file path to search :

Command :

```
$ film_master --project PROJ1 --composition "Test EDL" \
  --capture Z:\server\shots
INFO Opening project "PROJ1".
INFO Opening composition "Test EDL".
Clip                  | Start       | End         | Tape    | Status
----------------------+-------------+-------------+---------+----
 721A.[160447-160462] | 01:51:25:07 | 01:51:25:22 |    721A | Found
 722A.[226197-226236] | 02:37:04:21 | 02:37:06:12 |    722A | Found
 721A.[161937-161965] | 01:52:27:09 | 01:52:28:13 |    721A | Found
 722A.[227656-227683] | 02:38:05:16 | 02:38:06:19 |    722A | Found
```

Our status changes to "**Found**" and we will have clips (four in this case) loaded into the library. These clips are still *offline* in the monitor however.



Normally, when searching for source material, we will look at both a clip timecode and its *tapename* field when attempting to identify a match to the EDL/composition.

Matching Names

`--match-name <0|1>`

The --match-name option lets you specify whether to take a "name" into account when searching for material to conform.

The "name" we use is as set in the *preferences* - and might be **clip name**, **tape name** or **film name**. If we do not specify this option, the settings are taken from the *preferences*.

Our *capture* operation would then look like:

Command :

```
$ film_master --project PROJ1 --composition "Test EDL" \
  --capture Z:\server\shots \
  --match-name 0
INFO Opening project "PROJ1".
INFO Opening composition "Test EDL".
Clip                  | Start       | End         | Tape   | Status
----------------------+-------------+-------------+--------+-------
 721A.[160447-160462] | 01:51:25:07 | 01:51:25:22 |   721A | Found
 722A.[226197-226236] | 02:37:04:21 | 02:37:06:12 |   722A | Found
 721A.[161937-161965] | 01:52:27:09 | 01:52:28:13 |   721A | Found
 722A.[227656-227683] | 02:38:05:16 | 02:38:06:19 |   722A | Found
```

Handles

`--handle-length <N>`

Use this option to specify how many head and tail handles to capture.

Capturing with Exact Timecode

`--exact-timecode`

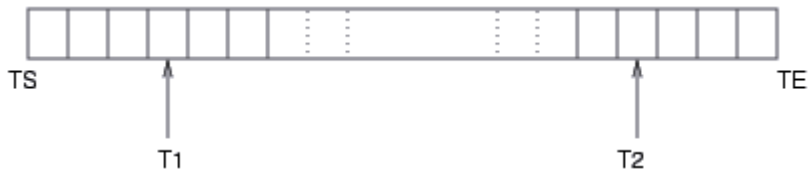
If our EDL looks like the following:

```
TITLE: Test EDL
001 721A V C T1 T2 ....
```

where

- T1 is the source in timecode
- T2 is the source out timecode

And our source clip looks like :



where

- TS is the clip first frame timecode
- TE is the clip last frame timecode

Then :

- Normally, a capture operation would find a match for this source clip because our EDL source in/out timecode is **completely enclosed** within the clip.
- Using `--exact-timecode` will only match during a capture if the EDL source in/out timecode **exactly** matches the source clip i.e. T1 == TS AND T2 == TE

Command :

```
$ film_master --project PROJ1 --composition "Test EDL" \
  --capture Z:\server\shots \
  --exact-timecode
```

Conform

`--conform`

After the *capture* stage, we can do a *conform*. This will **link** captured material to the composition timeline where the capture status is *Found*.

Command :

```
$ film_master --project PROJ1 --composition "Test EDL" \
  --conform
INFO Opening project "PROJ1".
INFO Opening composition "Test EDL".
INFO Conforming material...
```

Generating Local Proxies

--generate-proxies	Generate proxies
--range <M> <N>	Specify a range of proxies to generate

Generating Proxies for a Composition

`--generate-proxies`

Generate all the proxies for specified composition :

Command :

```
$ film_master --project PROJ1 --composition COMP1 \
  --generate-proxies
INFO Opening project "PROJ1".
INFO Opening composition "COMP1".
INFO Generating proxies for composition...
INFO gen ... 0 frames of 98 (0%)
INFO gen ... 1 frames of 98 (1%)
INFO gen ... 2 frames of 98 (2%)
...
INFO gen ... 98 frames of 98 (100%)
```

Generating Proxies for a Clip

`--clip-name N --generate-proxies`

To generate proxies for a specific clip in a composition, give the **clip name**:

Command :

```
$ film_master --project PROJ1 --clip-name CLIP2 \
  --generate-proxies
INFO Opening project "PROJ1".
INFO Generating proxies for clip...
INFO Creating new composition "CLIP2".
INFO gen ... generated 0 frames of 15 (0%)
INFO gen ... generated 1 frames of 15 (6%)
INFO gen ... generated 2 frames of 15 (13%)
...
INFO gen ... generated 15 frames of 15 (100%)
```

Generating Proxies on a Range

`--range A B`

You can generate proxies for a range of frames using the `--range` option. This will work on a range of frames *within a clip* or on a range *within a whole composition*, depending on usage.

Within a **clip**:

Command :

```
$ film_master --project PROJ1 --clip-name CLIP1 \
  --range 10 20 --generate-proxies
INFO Opening project "PROJ1".
INFO Found clip. Origin is 1.
INFO Generating proxies for clip...
INFO Creating new composition "CLIP1".
INFO gen ... generated 0 frames of 10 (0%)
INFO gen ... generated 1 frames of 10 (10%)
...
INFO gen ... generated 10 frames of 10 (100%)
```

If you only give a *start* frame for the range (e.g. `--range 30`), then the proxies will be generated from this frame (in the clip) to the end of the clip.

Within a **composition**:

Command :

```
$ film_master --project PROJ1 --composition COMP1 \
  --range 30 50 --generate-proxies
INFO Opening project "PROJ1".
INFO Opening composition "COMP1".
INFO Generating proxies for composition...
INFO gen ... generated 0 frames of 21 (0%)
INFO gen ... generated 1 frames of 21 (4%)
...
INFO gen ... generated 21 frames of 21 (100%)
```

If you only give a *start* frame for the range (e.g. `--range 60`), then the proxies will be generated from this frame to the end of the composition.

Exporting Shots

--export <path>	Export/render supplied composition to specified path
--export-mode <single|multi>	Choose mode of export (single or multi). **Required.**
--multi-mode <visible-src|tracks-src|ivisible-rec|tracks-rec>	Set export mode. **Required when using *multi* mode export.**
--frame-padding <N>	Set with of numeric padding on filenames on export. This will be zero-padded.
--export-handles <N>	Export each shot with specified handles **Required when using *multi* mode export.**
--smpte-level-clip <true|false>	Clip the exported shot colourspace to SMPTE video levels

Exporting a Composition

`--export <path>`
`--export-mode <single|multi>` **REQUIRED**

This command will render and export the specified composition (given by the `--composition` parameter) to the specified path.

The <path> argument should be the *full* path, **including the drive letter, filename and extension**.

The export *mode* option is **required**.

Command :

```
$ film_master --project PROJ1 --composition COMP1 \
  --export-mode single \
  --export Z:\jobs\001\graded_m.dpx
INFO Opening project "PROJ1".
INFO Opening composition "COMP1".
INFO export ... exported 0 frames of 60 (0%)
...
INFO export ... exported 60 frames of 60 (100%)
```

Exporting shots on the command line will **not** generate *caches*. This is different behaviour to the GUI where you have a choice of caching behaviour when exporting media.

Export Variables

The export path specified with `--export` can contain export variables such as $o, $f etc.

See section Export Variables for a description of available variables.

Example

```
--export S:\exports\$o\$c_graded..dpx \
  --export-mode single
```

Producing a single file sequence named from the *clip name*, in a folder named from *composition* :

```
GRADED_MASTER\approved.090000.dpx ... approved.092421.dpx
```

Exporting Numeric Files

To export files with **numeric filenames only**, use the **$f** (frame number) variable :

```
--export S:\exports\$e\$f.tiff
```

Produces numeric files in event folders e.g.

```
0045\008331.tiff
```

Export Modes

`--export-mode <single|multi>` **REQUIRED**

```
--multi-mode <visible-src|visible-rec|tracks-src|tracks-rec>
--export-handles <N>
```

You can export your composition as a **single contiguous clip** (*single*), in **multiple shot chunks** (*multi*), using **source timecode** (*src*) or using **record timecode** (*rec*).

There is one single mode and four types of multi mode, each multi mode laying out the exported shots slightly differently. The four multi modes are :

- `--multi-mode visible-src`
- `--multi-mode visible-rec`
- `--multi-mode tracks-src`
- `--multi-mode tracks-rec`

Because shots might be overwritten if they have **overlapping timecodes**, you should consider the use of an *event folder variable* ($e) when exporting.

See the Exporting chapter for a fuller description of Export Modes.

Example

The following examples are split over two lines using a line continuation character. In reality, the command would be on a single line only.

```
--export S:\export\$e\$c..dpx --export-mode multi \
  --multi-mode visible-rec --export-handles 20
```

Producing multiple event folders, each containing one shot with record order timecodes :

```
0001/NOCLIP.090000.dpx ...
0002/fixed.0090078.dpx ...
etc.
```

Frame Number Padding

```
--frame-padding <N>
```

This sets the numeric padding on exported filenames.

Numbers are **zero padded** i.e. 008999.dpx is frame padding of six.

Shot Handles

`--export-handles <N>`

In multi-mode export, set how many handles to export per shot. **This is required in multi-mode.**

SMPTE Level Clip

`--smpte-level-clip <true|false>`

This setting will clip the exported shot to a SMPTE video level (i.e. 64-940 for 10 bit data).

This is only applicable to **SMPTE** colourspace projects.

Exporting an EDL

`--export-edl <edl file>`	Export supplied composition to specified EDL file
`--use-frame-numbers`	Use frame numbers in EDL instead of timecode

Exporting an EDL

`--export-edl <edl file>`

This command will export the the specified composition (given by the `--composition` parameter) to the specified EDL file.

The <edl file> argument should be the *full* path, **including the drive letter, filename and extension**.

Command :

```
$ nucoda_film_master --project project-x --composition c
  --export-edl S:\edl1.edl
INFO Opening project "project-x" from "D:\Nucoda\2014_1\projects\project
INFO Opening composition "comptest".
```

Result

The output EDL will be standard EDL (CMX) format with timecodes e.g.

```
TITLE: comptest
FCM: PAL
001  tape-1   V   C   05:04:46:13 05:04:56:03 01:03:16:04 01:0
* FROM CLIP NAME:
* FROM FILE: S:\media\images\mazda-2k\OE5012A\438877.dpx
* FROM COMMENT:
```

Exporting with Frame Numbers

`--use-frame-numbers`

When exporting an EDL, use `--use-frame-numbers` to include frame numbers instead of timecodes in the output EDL.

Command :

```
$ nucoda_film_master --project project-x --composition c
  --export-edl S:\edl1.edl --use-frame-numbers
INFO Opening project "project-x" from "D:\Nucoda\2014_1\projects\project
INFO Opening composition "comptest".
```

Result

The output EDL will be standard EDL (CMX) format with frame numbers e.g.

```
TITLE: comptest
FCM: PAL
001  tape-1   V     C   457163  457403  94904  95144
* FROM CLIP NAME:
* FROM FILE: S:\media\images\mazda-2k\OE5012A\438877.dpx
* FROM COMMENT:
```

Saving and Loading Compositions

`--save-composition <file path>`	Save given composition and all referenced source clips to given file.
`--load-composition <file path>`	Load composition and all referenced source clips to given file.

Save Composition

`--save-composition <file path>`

This command will save the the specified composition (given by the `--composition` parameter) to the specified file.

The <file path> argument should be the *full* path, **including the drive letter, filename and extension**.
Composition content files saved through the GUI are given an extension .content.

Command :

```
$ nucoda_film_master --project project-x --composition c
  --save-composition S:\output\comp1.content
INFO Opening project "project-x" from "D:\Nucoda\2014_1\projects\project
INFO Opening composition "comptest".
```

Load Composition

--load-composition <file path>

Load the composition from given composition file into the specified project.

Command :

```
$ nucoda_film_master --project project-x \
  --load-composition S:\new\day\day011.content
INFO Opening project "project-x" from "D:\Nucoda\2014_1\projects\project
```

The composition file will be loaded and create a composition with the same name and contents as the original (saved) composition.

Rendering a Composition Cache

--render-output	Render caches for supplied composition

--render-output

This command will render the **caches** for the specified composition.

Command :

```
$ film_master --project PROJ1 --composition COMP1 \
  --render-output
INFO Opening project "PROJ1".
INFO Opening composition "COMP1".
INFO Rendering output for composition...
INFO render output ... 226 still to render (0)
INFO render output ... 224 still to render (0)
...
INFO render output ... 0 still to render (100)
```

Running Batch Operations

--batch-mode <file>	Run CLI commands from file
--ops-file <file>	Run some commands from file

Both these options run application commands from the given text file. The advantage of this is that the commands complete much more quickly than if run separately on the command line because the application only needs to startup, initialise and open projects or compositions once.

The "ops-file" command is left for backwards compatibility. The "batch-mode" option is new and much more flexible and powerful. **It also supports all CLI commands.**

Batch Mode

--batch-mode <file>

Run the command-line commands from the given text file. Each command line should be placed on a separate line of the file and any valid command line is allowed. The application will load the file and run each line as if you were typing them interactively.

You do not need to include the application executable on each batch file line i.e. write batch file lines like :

```
-p TestProject -c Compname --splice <path>
```

Example Batch File

```
--project P --composition C --splice Z:\shots\dpx\056_004.001.dpx
-p P -c Compname --splice Z:\shots\dpx\078_021.001.dpx --record-in 8992
--project ProjectX --import-folder S:\images\testfiles
```

Ops File

--ops-file <file>

This options allows you to take commands to run from a specified text file but is more limited in the commands it supports.

Command :

```
$ nucoda_film_master --project PROJ1 \
  --composition COMP1 \
  --ops-file ops.txt
INFO Opening project "PROJ1".
INFO Opening composition "COMP1".
INFO Found range (1, 5).
INFO Clip added to composition.
INFO SPLICE : /server/shots/shot1/clip.00001.dpx (0.03 secs)
INFO Found range (1, 5).
INFO Clip added to composition.
INFO SPLICE : /server/shots/shot2/clip.00001.dpx (0.01 secs)
INFO Found range (1, 3).
INFO Clip added to composition.
...
```

Commands are read from the file and then run, the project and composition are opening only once. The
project will be saved every now and then.

Supported Commands

Currently supported commands are:

- splice
- overwrite
- add-version
- replace-source

Command Format

Each operation will be on a separate line and have the following format :

```
<operation> <path> [record in] [source in] [track]
```

e.g.

```
splice Z:\shots\dpx\056_004.001.dpx 100
overwrite Z:\shots\test\011_v1.0001.cin 10 1 V2
replace-source Z:\server\ttt\ttt.0001.cin 95662 - V1
splice \images\test\ttt\ttt.0001.cin 1002 - V2
add-version Z:\server\scene4\78818.cin 67711 211 V3
```

A dash "-" acts as a place-holder.

Interactive Mode

--interactive-mode

Interactive Mode lets you type command-line commands to the application from the Windows CMD prompt interactively. This mode only needs to start the application once and is therefore faster.

Interactive Mode is useful for testing out the command-line.

Command :

```
$ nucoda_film_master --interactive-mode
INFO Set current user to "Default".
Interactive mode.  Type --quit to exit.
>
>--list
Projects:
   1: PROJ1                - D:\Nucoda\2014_1\projects\PROJ1
   2: PROJ1.export         - D:\Nucoda\2014_1\projects\PROJ1.export
   3: PROJC                - D:\Nucoda\2014_1\projects\PROJC
>-p PROJ1 --import-folder S:\media\images\testsequences\timeline_tests\C
INFO Opening project "PROJ1" from "D:\Nucoda\2014_1\projects\PROJ1".
INFO Batch Import (running) : "Importing" - importing directory 0 of 1 (
INFO Batch Import (running) : "Importing" - importing directory 1 of 1 (
INFO Batch Import (completed) : "Importing" - importing directory 1 of 1
>--quit
```

At the interactive mode prompt (>), you can type any valid command-line command and see the result immediately.

Use `--quit` to exit interactive mode.

Listing Information

--list	List projects, or compositions within projects.
--capture-list	List details to list captured material
--clip-list [s]	List details of clips in composition

Any item listed includes an **index**. You can use this index when performing remove operations.

Listing Projects

`--list`

To list projects available, use the command `--list` :

Command :

```
$ film_master --list
Projects:
  1: test1                - C:\Nucoda\...
  2: Check Danger 002     - C:\Nucoda\...
  3: Check Danger 003     - C:\Nucoda\...
  4: Road Less Travelled Part 1 - C:\Nucoda\...
  5: Who Goes Here        - C:\Nucoda\...
  6: Mist Snow Fog and Rain 1 - C:\Nucoda\...
  7: Mist Snow Fog and Rain 2 - C:\Nucoda\....
  8: Road Story 002       - C:\Nucoda\2009_1\....
  9: et                   - C:\Nucoda\2009_1\....
 10: et2                  - C:\Nucoda\2009_1\....
```

Listing Compositions

To list compositions available within a project, use the command:

Command :

```
$ film_master --project PROJ1 --list
INFO Opening project "et2" from "C:\Nucoda\2014_1\root\projects\et2".
Compositions in project "et2" of "C:\Nucoda\2014_1\root\projects\et2":
   1: Comp         - imported from C:\Temp\et.edl ...
   2: Graded 001   - Tue 16 Feb 2010  16:22:13
   3: Check        - Tue 16 Feb 2010  16:22:14
```

List Captured Material

`--capture-list`

This option lists the status of captured material from the specified composition. It is only relevant if the composition contains **list captured material**.

Command :

```
$ film_master --project et2 --composition Comp \
  --capture-list
INFO Opening project "et2" from "C:\Nucoda\2014_1\root\projects\et2".
INFO Opening composition "Comp".
Clip(s) from composition "Comp" in project "et2" of ..
    |Clip                    | Start       | End         | Tape      | St
----+------------------------+-------------+-------------+-----------+---
   1|          blue.[27-127] | 00:00:01:02 | 00:00:05:02 |      blue | Re
   2|        green.[203-272] | 00:00:08:03 | 00:00:10:22 |     green | Re
   3|     purple.[1085-1185] | 00:00:43:10 | 00:00:47:10 |    purple | Re
   4|         yellow.[39-88] | 00:00:01:14 | 00:00:03:13 |    yellow | Re
INFO Opening composition "Comp".
```

Once captured the shot *Status* field will change to **Found**.

List Clips and Associated Material

`--clip-list [s]`

This option lists details of all clips in specified composition, including :

- The clip *material name*
- The clip *date* and *time* of import

If you include the argument "s", the clip .Material GUID is also displayed.

Command :

```
$ film_master --project et2 --composition Comp \
  --clip-list
INFO Opening project "et2" from "C:\Nucoda\2014_1\root\projects\et2".
INFO Opening composition "Comp".
Clips in project "et2" of "C:\Nucoda\2014_1\root\projects\et2":
   1: blueframe export-tests - Tue 16 Feb 2010  16:07:32
   2: cyanframe export-tests - Tue 16 Feb 2010  16:07:32
   3: greenframe export-tests - Tue 16 Feb 2010  16:07:33
   4: purpleframe export-tests - Tue 16 Feb 2010  16:07:33
   5: yellowframe export-tests - Tue 16 Feb 2010  16:07:33
```

Removing Items

--remove-project <name>	Remove named project
--remove-indexed-project <index>	Remove project with index
--remove-composition <name>	Remove named composition
--remove-indexed-composition <index>	Remove composition with index
--remove-clip <name>	Remove named clip
--remove-indexed-clip <index>	Remove clip with index

Removal operations **cannot be undone**. You may wish to **backup** (copy) your project folder before using them.

Each removal operation can work on the name of an item, or its index. The **item index** is as returned from a list operation e.g.

Command :

```
$ film_master --project et --list
INFO Opening project "et2" from "C:\Nucoda\2014_1\root\projects\et2".
Compositions in project "et2" of "C:\Nucoda\2014_1\root\projects\et2":
   1: Comp         - imported from C:\Temp\et.edl ...
   2: Graded 001   - Tue 16 Feb 2010  16:22:13
   3: Check        - Tue 16 Feb 2010  16:22:14
```

To **remove** the *Graded 001* composition, use the command :

Command :

```
$ film_master.exe --project et --remove-indexed-composit
INFO Opening project "et" from "C:\Nucoda\2014_1\root\projects\et".
INFO Deleting composition indexed 2 "Graded 002" from \
  project "et" of "C:\Nucoda\2014_1\root\projects\et".
```

Removing Projects

```
--remove-project <name>
--remove-indexed-project <index>
```

To **remove** a project by :

Name :

Command :

```
$ film_master.exe --remove-project "Check Danger 003"
INFO Deleting project "Check Danger 003" from \
  "C:\Nucoda\2014_1\root\projects\Check Danger 003".
```

Index :

Command :

```
$ film_master.exe --project et --remove-indexed-project
INFO Deleting project indexed 2 - "Check Danger 002" of \
  "C:\Nucoda\2014_1\root\projects\Check Danger 002".
```

Removing Compositions

```
--remove-composition <name>
--remove-indexed-composition <index>
```

You must specify the project name.

Example :

Command :

```
$ film_master.exe --project et2 --remove-composition Che
INFO Opening project "et2" from "C:\Nucoda\2014_1\root\projects\et2".
INFO Deleting composition "Check" from project "et2" \
  of "C:\Nucoda\2014_1\root\projects\et2".
```

Removing Clips

```
--remove-clip <name>
--remove-indexed-clip <index>
```

You must specify the project and the composition.

Example :

Command :

```
$ film_master.exe --project et2 --composition Comp \
  --remove-clip "tc first"
INFO Opening project "et2" from "C:\Nucoda\2014_1\root\projects\et2".
INFO Opening composition "Comp".
INFO Deleting clip "tc first" from project "et2" of "C:\Nucoda\2014_1
\root\projects\et2".
```

Counting and Adding Tracks

--count-tracks <video|audio>	Count how many tracks of specified type are in composition
--add-track <video|audio>	Add a new track of specified type to existing composition

Count Tracks

`--count-tracks <video|audio>`

This command will count how many tracks of the type specified exist in the named composition.

Command :

```
$ film_master --project PROJ1 --composition COMP1 \
  --count-tracks video
INFO Opening project "ttt".
INFO Opening composition "COMP1".
INFO Total video tracks : 3
```

Command :

```
$ film_master --project PROJ1 --composition COMP1 \
  --count-tracks audio
INFO Opening project "ttt".
INFO Opening composition "COMP1".
INFO Total audio tracks : 2
```

Add a Track

`--add-track <video|audio>`

This command will add a track of the type specified to the named composition. The number of the new track added is returned.

Command :

```
$ film_master --project PROJ1 --composition COMP1 \
  --add-track video
INFO Opening project "ttt".
INFO Opening composition "COMP1".
INFO New video track added number : 4
```

We will now have a new track "V4" in the composition "COMP1" above.

Testing for a GUI Lock

--testlock	Test if the GUI has a lock (and therefore GUI is open)

Testing if the GUI is Running

`--testlock`

This command will test if the GUI is open (and the application is holding a *lock* file).

Command :

```
$ film_master --testlock
$ echo $?
0
```

Return :

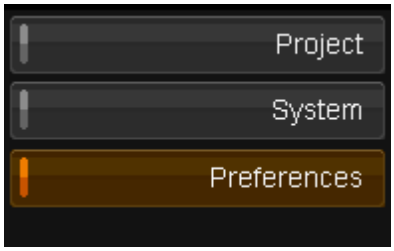
- 0 : GUI is **not** running (no lock)
- 1 : GUI is **running** (lock held)

This must be the **first argument** on the command-line.

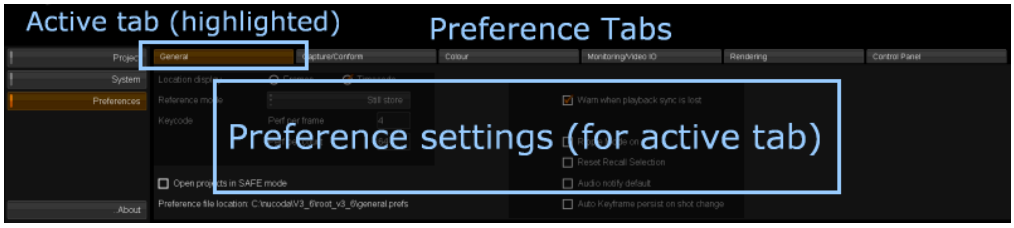
Appendices

Appendices 25

Application Preferences



To access the application preferences, from the main project screen, click the ***Preferences*** button.



Here you can adjust the default system-wide preferences.

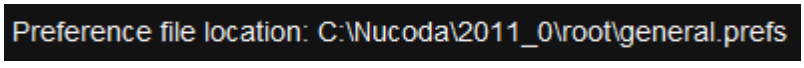
> Changes will apply to all new and existing projects.

> **Note** that many of these settings can be overridden within a project.

The *Preferences* screen has a subset of screens, selectable via the tabs across the top:

- General preferences
- Capture/Conform preferences
- Colour preferences
- Video/VTR preferences
- Rendering preferences
- Control Panel preferences

Preference File



The location of the main preference file is displayed at the bottom of the *General* tab section.

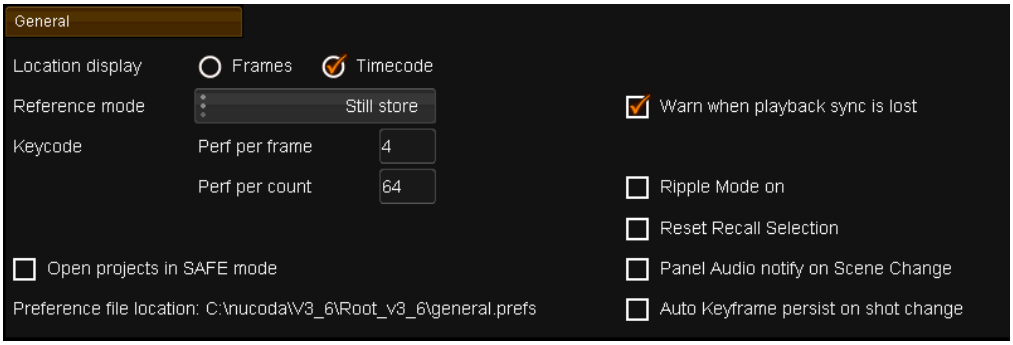
Most preferences are stored in a text file called *general.prefs*, located in the application ROOT folder.

The ROOT folder is set in the environment variable :

`NUCODA_ROOT_V2014_1`

Some application preferences can only be changed by editing the *general. prefs* file.

General



The general preferences screen specifies global configuration settings.

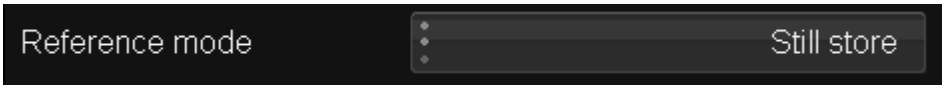
Location display

Select whether you want the default location display across your project to show *frame numbers* or *timecodes*. Changing the display style will affect the following:

- the timeline timebar
- the current position and in/out duration displays on the GUI and control panel
- the in / out values in the library
- the render progress report

This setting can also be changed from within your project.

Reference mode



Values : Still store, Live memory
Default : Still store

Select whether comparisons against the *reference frame* should be carried out in *still store* or *live memory* mode.

Keycode

A keycode allows the unique identification of any frame on a reel of film. For a film reel, these settings define :

-
- *Perfs per frame* - how many perforations in one film frame
- *Perf per count* - how many perforations make up one keycode count increment

See Appendix Keycode.

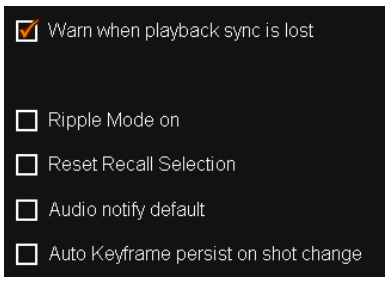
SAFE mode

Normally, opening a project automatically selects to edit (and display) your current composition. Selecting *Safe Mode* will not do this, and open a project with **no composition selected**.

This may be useful if a composition causes errors or problems when opening a project.

This should be left **off** in normal use.

Other Settings



Warn when playback sync is lost

This controls the display of a warning indicator (red arrow) on your monitor when playback drops below realtime (as defined for currently selected output format). If **off**, this warning will not be shown, even if playback is less than realtime.

> Changing this setting requires an application restart.

Ripple Mode on

Whether *ripple mode* should default to **off** or **on** in new projects.

Reset Recall Selection

Whether the source of a *Recall* action (effects/layers recalled) should reset afterwards, or persist.

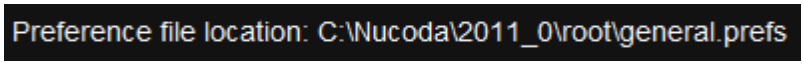
Audio notify default

This enables an audio notification (sound event) on event/shot change. **Control panel only**.

Auto Keyframe persist on shot change

This enables the persistence of the *Auto Keyframe* button on shot change.

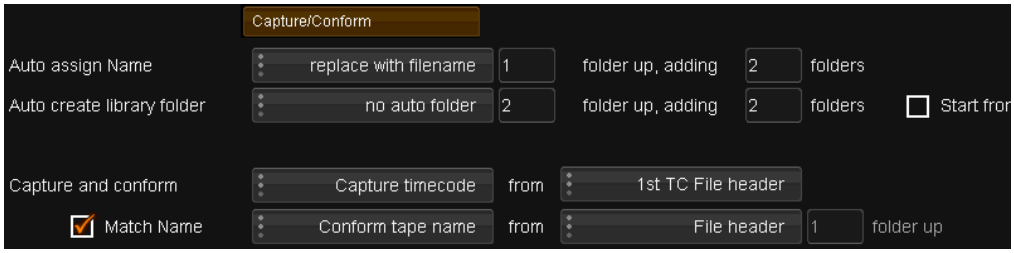
Preference File Location



The location of the main preference file is displayed at the bottom of the *General* tab section. Most preferences are stored in a text file called *general.prefs*, located in the application ROOT folder.

> The ROOT folder is set in the environment variable NUCODA_ROOT_V2014_1.

Capture/Conform



The *Capture/Conform* preferences screen specifies global configuration settings and conventions used when naming and conforming imported and captured material.

See Appendix Extracting Names for more detail on how we extract names from files and folders.

Auto Assign Name

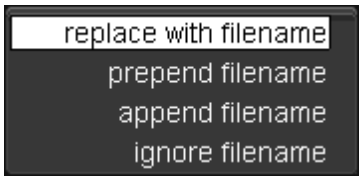
Defines what library *Material Name* we give imported files/sequences. This name is extracted from the file name and/or folder structure according to rules defined here.

Example folder/file sequence on disk :

```
three / two / one / clip.0000.dpx
```

Naming Options

The drop-down choice here modifies the *basic name* string we calculate via the *Folder Up/Adding* parameters (see appendix Extracting Names for details on calculating the basic name string).



replace with filename

Uses filename only.
This ignores any file/folder calculations (i.e. folder up/additions).

Material Name : `clip`

prepend filename

Place filename **before** the concatenated folders we use.

Material Name : `clip two one`

append filename

Place filename **after** the concatenated folders we use.

Material Name : `two one clip`

ignore filename

Just use the concatenated folders, no filename.

Material Name : `two one`

See : Appendix Extracting Names for details on the naming rules for the concatenated folder.

Folder Up

Which folder we start counting from. The folder containing the imported file/ sequence is index 0.

Adding folders

How many file/folder levels do we "add" as a name string, to create the final name.

Auto Create Library Folder

Defines if we create named folders in the project library automatically on material import.

The names created are extracted from the file name and/or folder structure according to rules defined here.

See : Appendix Extracting Names from File Folders

Example folder/file sequence on disk :

`three / two / one / clip.0000.dpx`

Naming Options

The drop-down choice here modifies the *basic name* string we calculate via the *Folder Up/Adding* parameters (see Appendix Extracting Names for details on calculating the basic name string).

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no auto folder

Do not create library folders automatically. Material is imported into current library folder.

Folder : none created

tape name

Name the folder from the *tapename* extracted on import.
The tapename is extracted as per the *Conform tape name* settings below.
This ignores any basic name file/folder calculations (folder up/ additions).
If the tapename cannot be determined, the folder is named "NOTAPE".

Folder : one (if we take tape name *from filename, 1 folder up*)

filename

Name the folder from the file structure on disk.

Folder : three two

filename hierarchical

Name the folder from the file structure on disk.
Unlike the *filename* option, this creates folders/subfolders **recursively** (whereas *filename* is flat).

Folder : three / two (folder *one* is inside *two*)

See Appendix Extracting Names for an explanation of the rules.

Folder Up

Which folder we start counting from. The folder containing the imported file/ sequence is index 0.

Adding folders

How many file/folder levels do we "add" to create the final name.

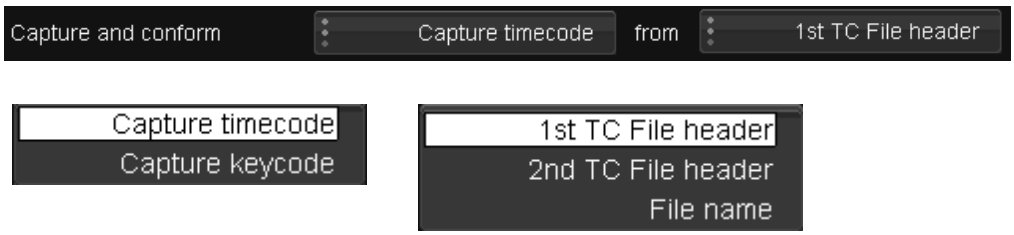
Start from Selected

This sets whether we create the folders under our currently *selected* library folder. If off, the folders are created under the library ***root*** folder.

Capture and Conform

Here we are configuring how we assign and set some other important information when importing/capturing material into our library.

Timecode / Keycode



The ***Capture timecode/Capture keycode*** drop-down list specifies where we extract the timecode information from.

The "timecode" can be an actual *timecode* or a film *keycode* , and both can uniquely identify a frame in a sequence.

Timecode

A timecode can be extracted from :

- **file header** (if available)
  The DPX file format has a timecode field. The RED R3D file format contains two timecodes.
- filename (numerics) e.g.
  clip.090000.dpx is timecode 01:00:00:00 @ 25 fps.

1st and 2nd Timecodes

The *2nd timecode* is only used for the RED R3D file format (which contain *two* timecode fields). In all other circumstances, use ***1st TC File header***. See the Red Support section.

Keycode

A keycode can only be extracted from a DPX file header. A keycode will give us both the *keycode* field in the project library and the *timecode* field.

See Appendix Keycode.

Assigning Tapename and Conforming

A *tapename* can be automatically assigned to a shot :

- When importing a shot *manually* via the Library file browser
- As part of an *EDL capture/conform* process

We can also choose if we use an EDL tape name, film name or clip name in addition to the timecode for differentiating events during conform.

Tapename

The *tape name* field in the project library is set via the preference parameters to the right of the *Conform ..* drop-down list.

When importing image sequences, it does not matter how the drop-down list to the left is set (whether *Conform clip name*, *Conform film name* or *Conform tape name*). **The high-lighted areas in the diagram above set the *tape name* in the library.**

The *tape name* can be extracted from :

- **file** header (if available)
  This is supported in the DPX file format.
  If the file format does not support this header field, the library tape name field is blank.
- file name
  This will be a single folder name at the specified level.
  A level of 0 (zero) selects the name of the file (e.g. clip).
  See Appendix Extracting Names.

For the DPX format, we use field 38, *input device name*, as a tape name/clip name/film name field.

Conforming

A basic conform process will compare events/shots on a **timecode basis only**. This method can sometimes result in multiple matches, where we have more than one candidate shot for the same timeline event.

To differentiate these multiple shot matches, we can extend our comparison to include *tape name* (or film name, or clip name).

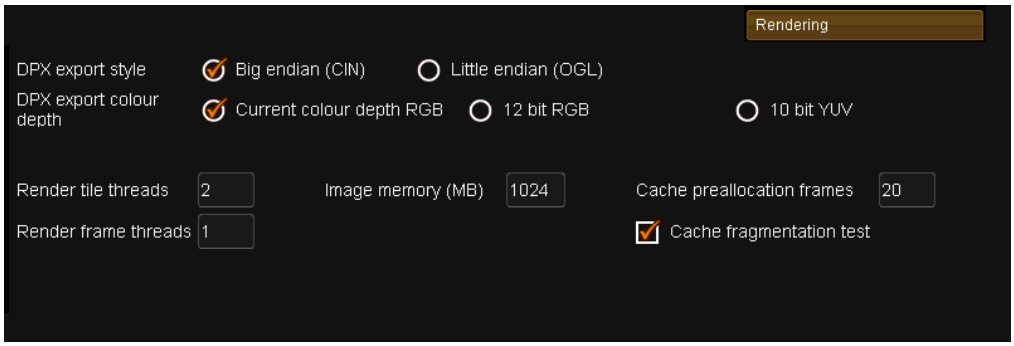
> The extra level of conform differentiation is performed if ***Match Name*** is **enabled**.

A drop-down list assigns the method used to differentiate *multiple* event/shot matches in a conform.

- Conform tape name
- Conform film name
- Conform clip name

> We take the associated names from the list (EDL,CTL etc.).

Rendering



The Rendering preference tab configures global settings used as defaults for various render parameters.

DPX Export Style

The default DPX image format used for DPX exports.

Values : Big endian, Little endian
Default : Big endian

- Big endian ("cineon" format)
- Little endian ("OpenGL" format)

A *big endian* DPX file has header magic **SDPX** (ascii). A *little endian* DPX file has header magic **XPDS** (ascii). This specifies the byte-order used in the file and has an impact on DPX compatibility. The default should be most compatible.

DPX Export Colour Depth

This specifies the default bit depth and colour data format for exported DPX image files.

- *Current colour depth RGB* - **default**. This sets the export bit-depth per channel as per the current output format, and uses RGB colour space.
- *12 bit RGB* - use 12 bits per channel, RGB.
- *10 bit YUV* - use 10 bits per channel, YUV.

Leave this at the **default** setting unless you are sure you need to change it.

Render Tile/Frame Threads

These settings control how many frames we try to render in parallel, and how each frame may be split for further concurrency in the render process.

- Render tile threads - this defines how each individual frame is split (tiled) for rendering in parallel across multiple CPU cores
- Render frame threads - this defines how many whole frames are rendered in parallel.

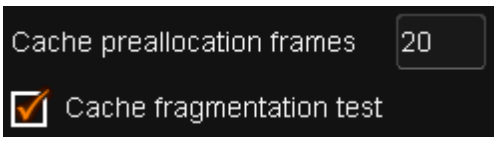
These settings are dependent on the system type. See the *Install and Configuration Guide* for configuration settings for various supported systems.

Image Memory

This setting defines a "pool" of memory the application will allocate for storing and rendering image sequences.

Leave this at the **default** setting unless instructed to change it by a Digital Vision engineer.

Cache Rendering Setup



These parameters setup some options on how cache renders are generated.

Cache preallocation frames

Values : text entry
Default : 20

This defines how many frames are *preallocated* for caches before the caches themselves are written to disk. This will help prevent caches getting fragmented.

To **disable** cache preallocation, set to 0 (zero).

Cache fragmentation test

Default : on

This test is for ***Windows NTFS* only**. Do **not** enable on SAN filesystems (e.g. *Stornext SNFS*).

If turned **off**, caches will *not* be tested for fragmentation and no fragmentation status will be displayed on the timeline.

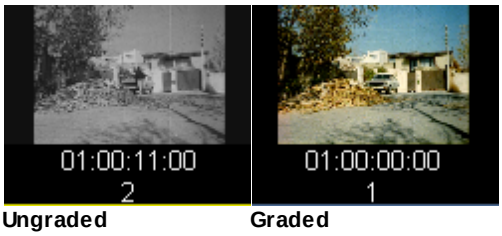
Fragmented cache files are displayed in **bright-red** on the timeline :

Memories

Display Ungraded as Greyscale

Default : Off

If **on**, ungraded shots are shown in **greyscale** in the *Memories* Window.



Ungraded **Graded**

Generate Thumbnails

Default : First frame
Values : First frame, Middle frame, Last frame

This option selects the default thumbnail displayed for each event in the *Memories* view.

Cue Method

Default : Timecode
Values : First frame, Middle frame, Last frame, Timecode

This option sets which frame we will cue to in a shot using CTRL+Cue on the *Media Panel*.

CTRL + Cue :

- **First frame** : cues to the *first* frame of the shot
- **Middle frame** : cues to the *middle* frame of the shot
- **Last frame** : cues to the *last* frame of the shot
- **Timecode** : cues to the event thumbnail timecode for the shot i.e. the timecode shown *below* the *Memories/Event* itself. This can be set via the ***Manual*** update method described in *Update Method* below.

Update Method

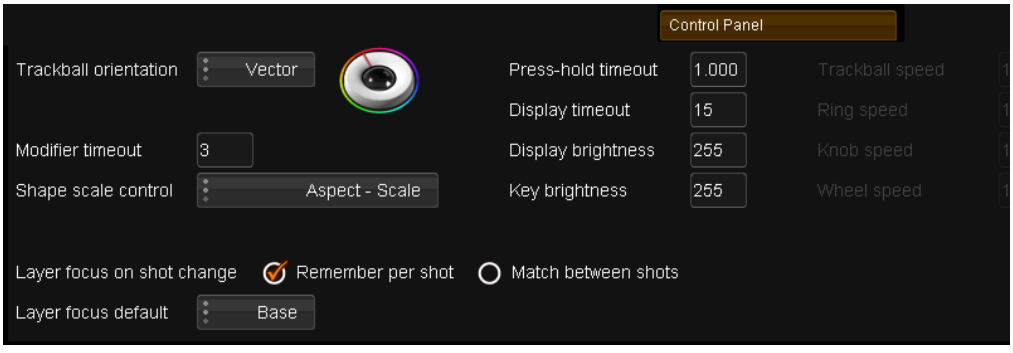
Default : Manual
Values : Auto, Manual

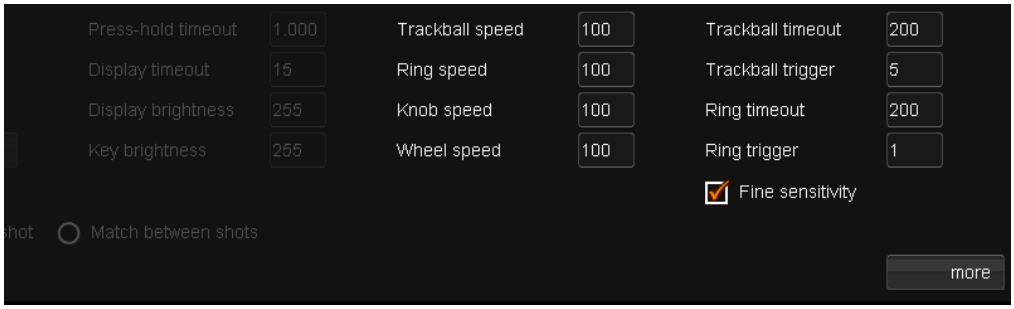
This option chooses how the *Memories* event thumbnail is updated :

- **Auto** : *Memories* thumbnail updates automatically when you grade a shot
- **Manual** : Press ***Enter*** on panel to update *Memories* thumbnail

When your Cue Method is set to Timecode, cueing (CTRL+Cue) will cue to the timecode

Control Panel





The *Control Panel* tab configures global settings used as defaults for various control panel parameters.

Trackball Orientation

See : Colour Preferences

Modifier Timeout

Default : 3 seconds

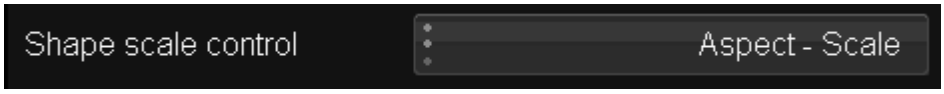
This specifies how long a *modifier* key will stay active ("locked") before timing out when no other key is pressed.

The modifier keys affected by this setting are :

- Ctrl
- Shift
- Delete
- Event
- Dyn
- All
- Clear

Setting this to **0** (zero) will *disable* locking the modifier key, and require both the modifier key and the (action) key to be pressed together.

Shape Scale Control



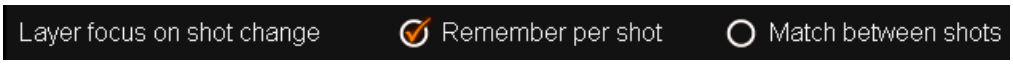
This controls how shapes are scaled using the control panel, and whether scaling happens in X and Y independently or together, with separate *aspect ratio* control.

The choices relate to the control panel menus visible under *Shapes* on the *Image* panel.

Values : Aspect - Scale, Scale X - Scale Y
Default : Aspect - Scale

- Aspect - Scale
  This is the **default**. On the control panel *Shapes* menu, we have an *Aspect* parameter and a *Scale* parameter.
- Scale X - Scale Y
  On the control panel *Shapes* menu, we have *Scale X* and *Scale Y* parameters.

Layer Focus on Shot Change



Default : Remember per shot

This option defines the layer focused policy when we jump between shots.

- *Remember per shot*
  The focused layer is **persisted** on a shot by shot basis. Returning to a shot will focus the same layer as focused previously on this shot. If navigating to a shot for the first time, focus is put to the *Layer Focus Default* (see below).
- *Match between shots*
  The focused layer is **persisted** *between* shots such that we keep the same layer focused on our new shot as was focused on the previous shot.

Layer Focus Default

Values : Effect, Base, Master
Default : Base

This option defines which layer we **focus** after a *Master Reset* on the control panel or the first time we visit a shot.

Press-hold Timeout

Default : 1 second

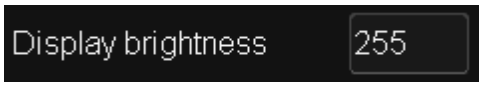
This refers to the length of time, in seconds, that you need to hold a button down before it goes into **repeat keystroke** mode.

Display Timeout

Values : User Set
Default : 15 minutes

How many minutes of inactivity before the panel displays are turned off.

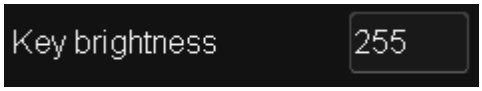
Display Brightness



Values : User Set (0 - 255)
Default : 255 (brightest)

The brightness of the LED display screens on the panel.

Key Brightness



Values : User Set (0 - 255)
Default : 255 (brightest)

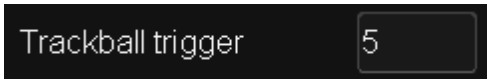
The brightness of the lights on the panel keys.

Trackball Timeout

Default : 200

This setting controls how fast the trackball "stops".
This parameter is deprecated and should not be changed.

Trackball Trigger



Default : 5

This setting controls how fast the trackball "starts".
This parameter is deprecated and should not be changed.

Ring Timeout

Default : 200

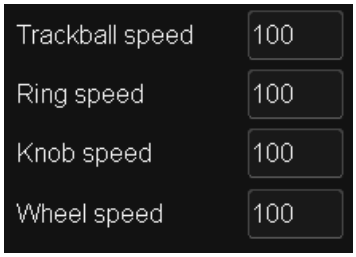
This setting controls how fast the rings "stop".
This parameter is deprecated and should not be changed.

Ring Trigger

Default : 1

This setting controls how fast the rings "start".
This parameter is deprecated and should not be changed.

Speed Settings



These speed settings control the overall sensitivity of the panel controls.

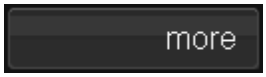
- Trackball Speed - the three trackballs on the *Colour* panel.
- Ring Speed - the three rings on the outside of each trackball on the *Colour* panel.
- Knob Speed - the parameter control knobs on the *Colour* and *Image* panels.
- Wheel Speed - the navigation wheel on the *Media* panel and the comparison wheel on the *Image* panel.

Higher values give more sensitivity.

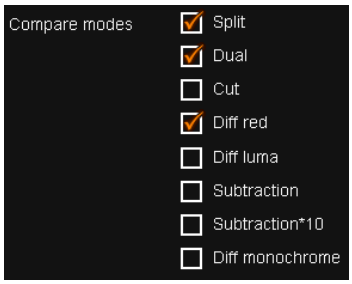
Fine Sensitivity

Ticking this box will make the rings and trackballs sensitive to very small changes, without affecting the sensitivity for larger changes. This means tiny changes can be applied via tiny movements of controls.

Compare Modes

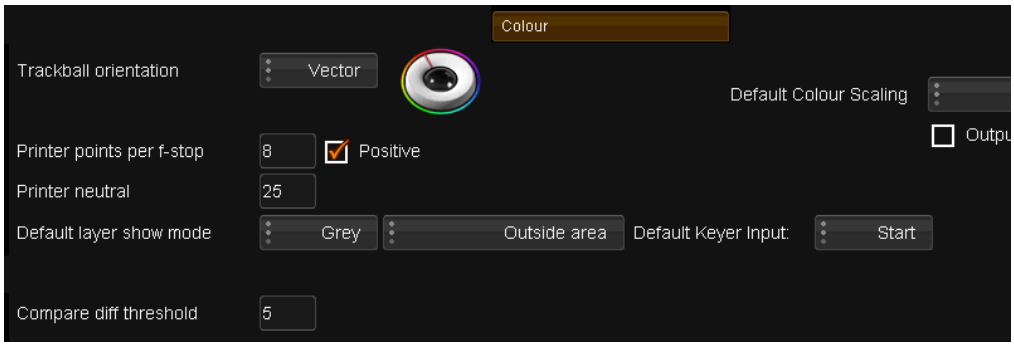


These parameters are on the next page of the Control Panel settings. Go to the next page by pressing the ***More*** button.



Enabled (ticked) items are available as compare modes inside the application.

Colour



The *Colour preferences screen* specifies global configuration settings controlling colour related controls and display.

Trackball Orientation

This specifies the orientation used for the colour-correction trackballs, both on

the control panel and the GUI interface.This configures the colour arrangement on the trackball.

Values : Vector. Offset, Offset 30, Offset 330
Default : Vector

Offset corresponds to the old *Rank* system

As you change this setting the trackball image next to the drop-down will update, indicating the current colour orientation :

The *Trackball Orientation* setting also appears in the *Control Panel preferences screen*.

Printer Points Per F-Stop

Range : User set
Default : 8

This setting specifies the number of printer points used to represent an **f-stop** for the *printer lights* tool.

Positive

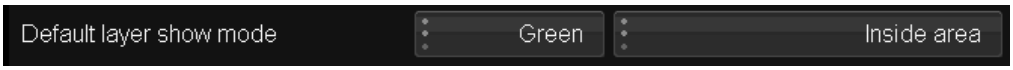
With the *Positive* setting enabled, the number you enter will *add* colour. Uncheck *Positive* to remove colour.

Printer Neutral

Range : User set
Default : 25

This value represents **no change** in the *printer lights* settings.

Default Layer Show Mode



Values : Red,Green,Blue,Cyan,Magenta,Yellow,White, Black,Grey,Saturated
Default : Grey

Values : Inside Area, Outside Area
Default : Outside Area

These settings correspond to :

- Show As
- Show Area (In/Out)

in the *Router* settings for each CC/Effect layer.

Default Keyer Input

Values : Previous, Base, Start
Default : Start

This configures which layer a *Keyer* effect will use as input and corresponds to the layer *Router* setting *Key Input*.

- *Start* - use **input** of Base Layer as input
- Base - use output of Base Layer as input
- Previous - use previous layer as input

Compare Diff Threshold

This is the threshold below which compare mode differences will not be registered. A higher value means we are **less sensitive** to difference.

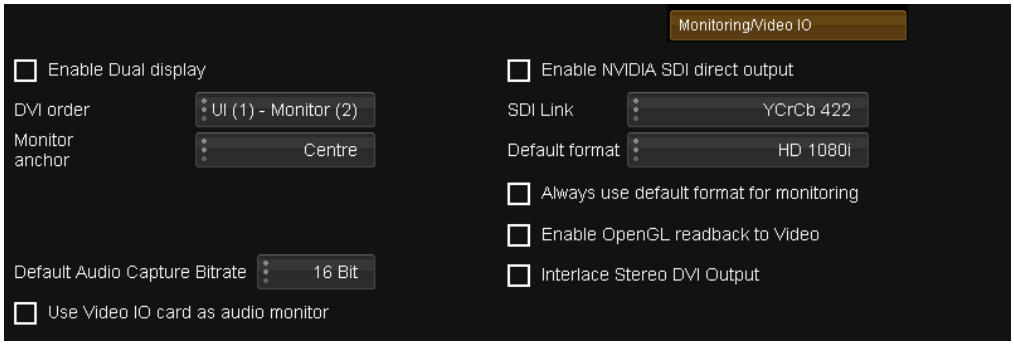
Range : User set
Default : 5 units

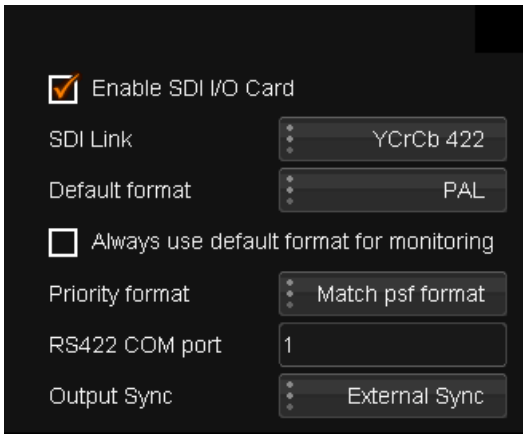
Default Colour Scaling

This parameter controls the default scaling mode used on a **new** project. See Project Colour Scaling.

For a discussion of colour scaling modes, see the *Colour Scaling* section in the *Setup Manual*.

Monitoring / Video IO





The *Monitoring/Video IO* preference tab configures global settings for display modes, timeline monitoring and video and audio I/O.

> Note that changing many of these settings requires an **application restart**.

Enable Dual Display

If *Enable Dual Display* is on, the application assumes a **two display configuration** and configures its screen layout appropriately.

> The *Enable Dual Display* checkbox should be **on** when using *NVIDIA SDI direct output*

DVI Order

Values : UI(1) - Monitor(2), Monitor(1) - UI(2)
Default : UI(1) - Monitor(2)

Use : All dual-display configurations.

This setting controls the *orientation* of the displays, where :

- UI - the graphical user interface (menus, buttons etc.)
- Monitor - the player, image display

> If the dual screen mode you configure is **invalid** and causes problems, you can always set the *general.prefs* preference file parameter *dualScreenMode* to *false* before restarting.

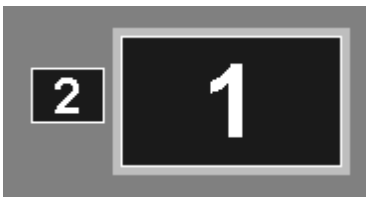
Monitor Anchor

Values : Centre, Top left
Default : Centre

Use : NVIDIA SDI in *extended desktop* mode

This setting is only relevant to the *extended desktop* mode NVIDIA SDI configuration i.e. SDI configured via the NVIDIA control panel. It is used to define the **positioning** of the NVIDIA SDI output in relation to the primary (UI) output, when the SDI output is a different size to the UI output i.e.

- UI output is HD (1920x1080 pixels)
- SDI output is PAL (720x576 pixels)

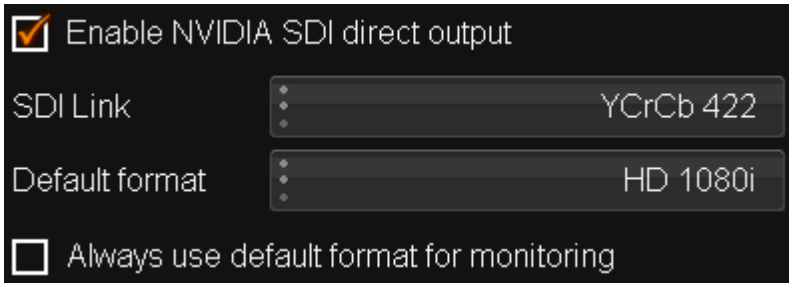
NVIDIA Display Settings	
	
SDI output is ID #2 Use : ***Top left***	SDI output is ID #2 Use : ***Centre***

Enable NVIDIA SDI Direct Output

These settings relate to the **NVIDIA direct SDI** monitoring output.

Use : Monitoring via NVIDIA **direct** SDI

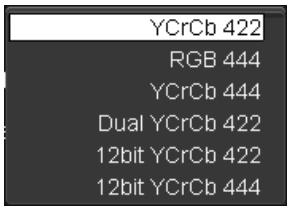
The *Enable Dual Display* checkbox should be **on** when using *NVIDIA SDI direct output*



NVIDIA **direct** SDI is our term for the application taking *direct control* of the NVIDIA card SDI monitoring signal. This means that no configuration is needed in the NVIDIA display control panel.

SDI Link

This specifies the default NVIDIA SDI colourspace and format.

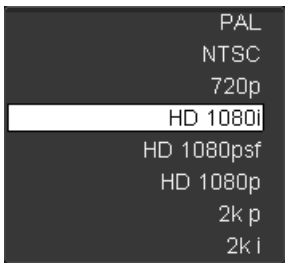


Values : YCrCb 422, RGB 444, YCrCb 444, Dual YCrCb 422, 12 bit YCrCb 422, 12 bit YCrCb 444

Default : YCrCb 422

Default Format

This specifies the default NVIDIA SDI video format to use.



Values : PAL, NTSC, 720p, HD 1080i, HD 1080psf, HD 1080p, 2k p, 2k i

Default : HD 1080i

Always use default format for monitoring

When **enabled**, the monitor is locked to the format set above and will not try and switch to a new format, even if its input changes.

This is useful if your output monitoring device does not support some output formats and you wish to lock it to a supported format.

Enable OpenGL readback to Video

This setting enables the OpenGL graphics on your display monitor to be sent to the video board output for display in realtime. This includes the colour grading as well as any HUD or graphs displayed.

This setting is only supported for NVIDIA FX4600 graphics cards (or better) and *DVS Centaurus2* video boards.

OpenGL read-back is not compatible with the *Interlaced Stereo DVI* setting below. When enabled, the *Interlaced Stereo DVI* setting will be hidden.

Interlaced Stereo DVI Output

When enabled, *Interlaced Stereo DVI Output* will convert the DVI signal to a *left* and *right* **stereo** channel mode.

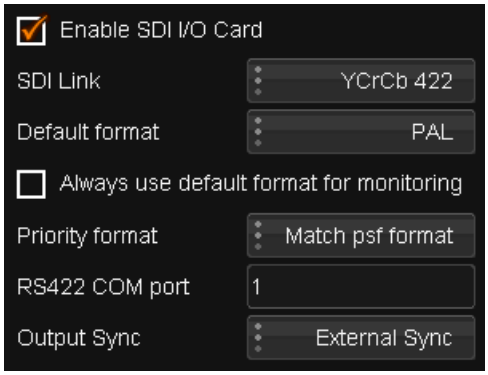
This stereo mode is supported on display devices like the *Zalman ZM-M220W* 3D LCD monitor.

Interlaced Stereo mode is **incompatible with OpenGL read-back** and will be hidden if read-back is enabled.

Enable SDI I/O Card

Use : Video I/O and Monitoring via video I/O card

These settings relate to your **SDI video** card (e.g. Centaurus2, Bluefish Lust).



SDI Link

This specifies the default video card SDI colourspace and format.

Values : YCrCb 422, RGB 444, YCrCb 444, Dual YCrCb 422, 12 bit YCrCb 422, 12 bit YCrCb 444

Default : YCrCb 422

Default Format

This specifies the default video card SDI video format to use.

Values : PAL, NTSC, 720p, HD 1080i, HD 1080psf, HD 1080p, 2k p, 2k i

Default : HD 1080i

Always use default format for monitoring

When **enabled**, the monitor is locked to the format set above and will not try and switch to a new format, even if its input changes.

This is useful if your output monitoring device does not support some output formats and you wish to lock it to something supported.

Priority Format

Use : Frame based project output formats

This setting is only relevant if we are using a *progressive* (frame) based (non-interlaced) project output format.

If we have a progressive output format (e.g. HD 1080p), this specifies whether we set our video I/O card to output a *progressive* signal ("p", *Match p format*) or a *progressive segmented fields* signal ("psf", *Match psf format*).

Values : Match p format
Default : Match psf format

RS422 COM Port

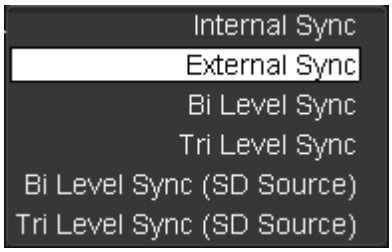
Default : 1

This sets the workstation serial (COM) port to use for VTR control.

> On a DVW workstation with built-in RS422 ports, this setting is **not used** if the environment variable USE_DVS_VTR_IF is set.

Output Sync

This setting specifies the sync signal the video I/O card uses.



Values : Internal Sync, External Sync, Bi Level Sync, Tri Level Sync, Bi Level Sync (SD Source), Tri Level Sync (SD Source)
Default : External Sync

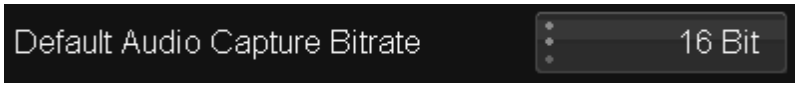
where :

- Internal Sync - sync is generated internally and is free-running on layoff
- External Sync - sync on input signal
- Bi Level Sync - used for SD (BB -0.3V)
- Tri Level Sync - used for HD (-0.3V to +0.3V)
- Bi Level Sync (SD Source) - use Bi level sync on HD project
- Tri Level Sync (SD Source) - use Tri level sync on SD project

Audio Settings

Default Audio Capture Bitrate

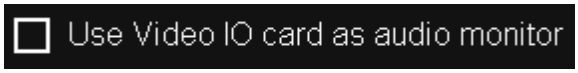
This setting specifies the *sample* size for VTR audio capture.



Values : 16 Bit, 32 Bit
Default : 16 Bit

Use Video IO Card as Audio Monitor

This setting will enable the video I/O card as the main audio monitoring device (rather than the computer workstation audio device).



This is a Centaurus2 video card option only.

This is a *DVS Centaurus2* video board option only.

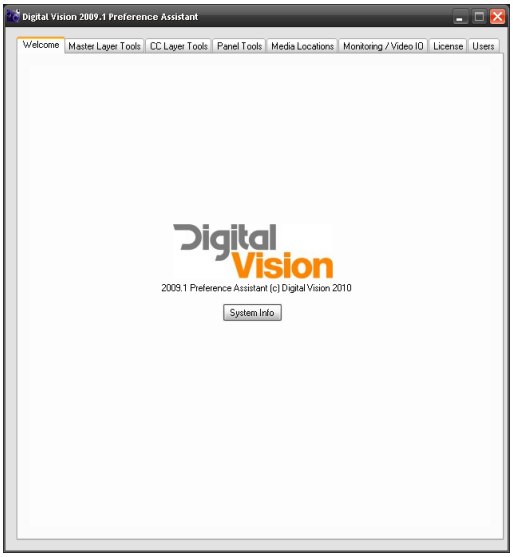
Preferences Assistant

The *Preference Assistant* is a utility tool for display and edit of the *general.prefs* file.

Run the main application at least once before using this tool.

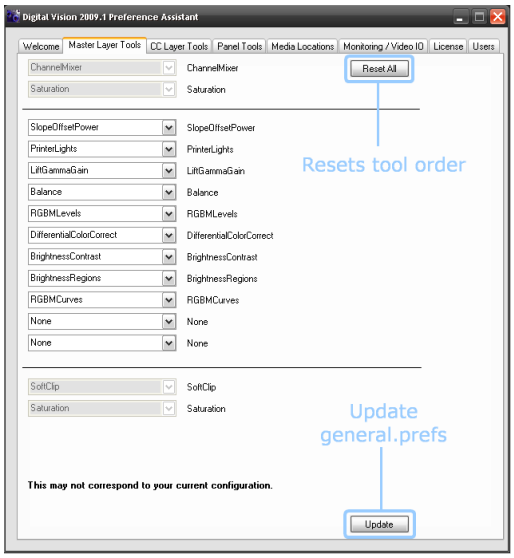
Hitting the UPDATE button on any tab will update your *general.prefs* file at that time. If you want to create multiple preferences, first go to the Users section and create a Default *general.prefs* file and then additional user files to update. Also note that the in application preferences will be applied to the current active user preference file.

Welcome Screen



On this tab you have the option to look at some system information such as operating system version, MAC Address, Cards and Drivers.

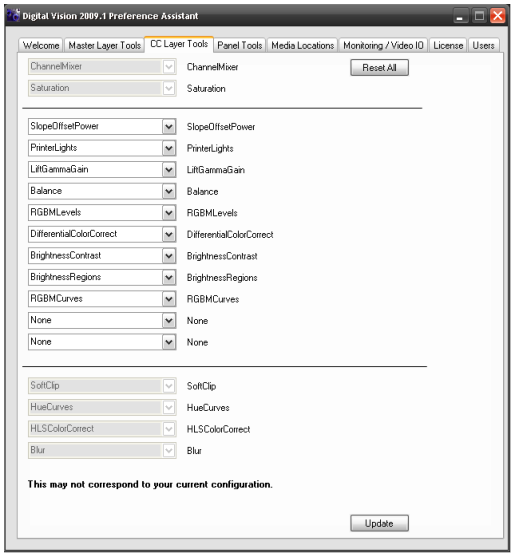
Re-order Master Layer Tools



Re-order or remove colour tools available on your *Master* layer.

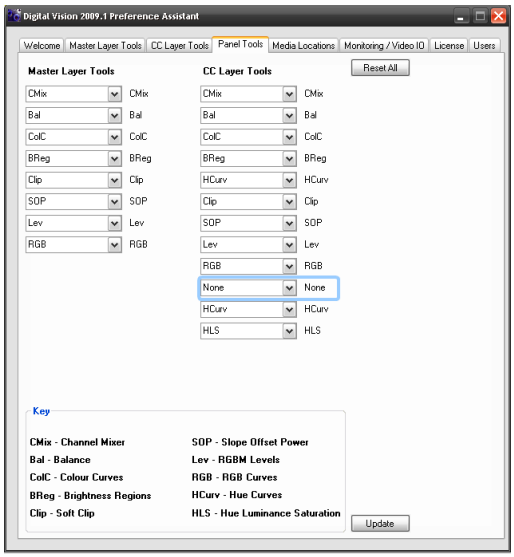
> The inactive tools can not be changed and have to remain in the given order.

Re-order CC Layer Tools



As the *Master* layer tab but operating on the *CC Layers*.

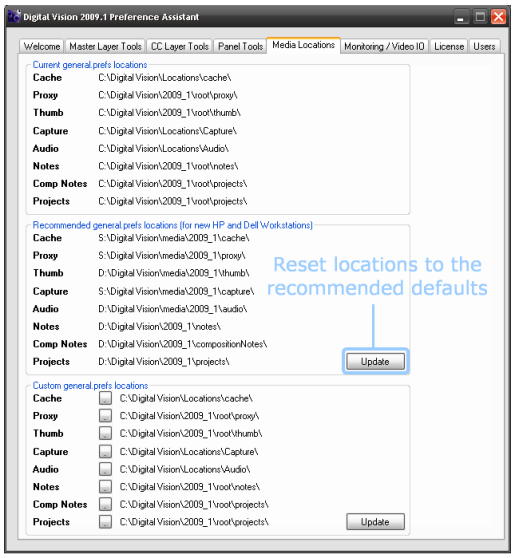
Re-Order Panel Tools



Re-order or remove tools available on your *Control Panel*.

Using *None* will leave a gap.

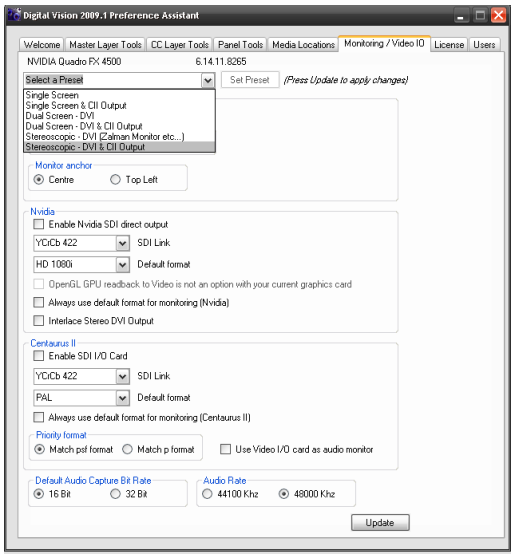
Media Locations



Show and set the various media folder locations.

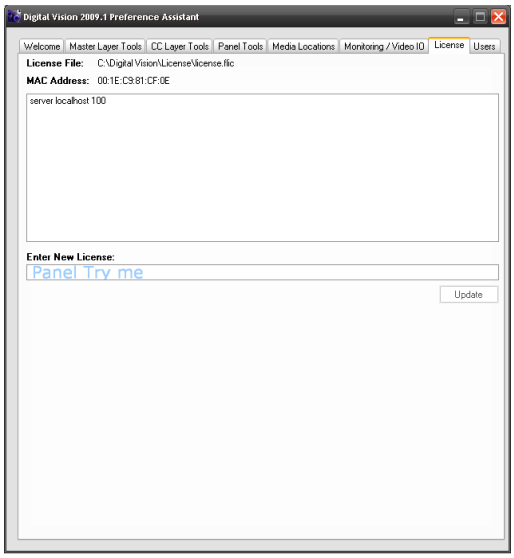
Avid Mediafiles locations should still be set in *general.prefs*

Monitoring and Video I/O



Monitor setup with presets for often used configurations. This is a mirror of what is in the Application Preferences.

License



View and update your license file.

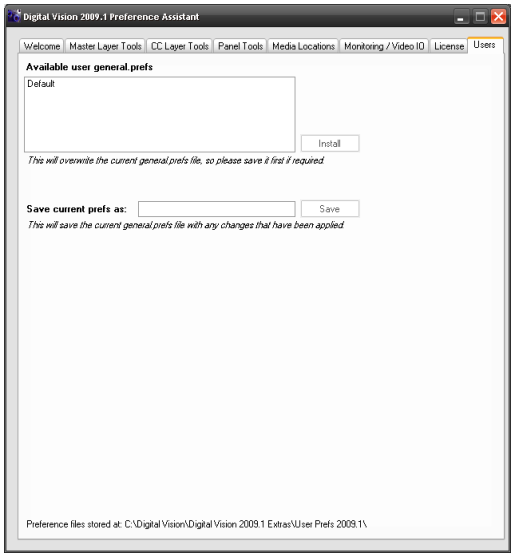
Copy the new license string into the text box and press the *Update* button.

If the string entered starts with "Panel", the rest of the string is taken as the *Control Panel* "welcome" string e.g.

Panel Grading System

Sets the *Control Panel* welcome string to *Grading System*. This is the *general.prefs* option `panel.welcomeString`.

Users



The *Users* tab lets you create separate preference files for multiple users and easily switch between them.

Recommendation :
Once you have set the basic configuration files, use this tool to save the current preference as *Default*.

Once you have done this you can change the preferences for a new user, update and save as as "User-01" "User-02" etc.

A list of user preferences will be displayed in the *Available user* box.

To switch to a different user, select the user and press the *Install* button.

These preference files are saved separately from the application, allowing you to re-install safely without losing preferences.

Keycode

Keycodes sre numbers appearing on the edge of film, incrementing once per foot, used to uniquely identify frames for negative cutting. Also known as edgecodes, they are the film equivalent of timecode. The key numbers identify certain traits of the film, including the manufacturer, the stock type, a prefix identifying the roll and a footage count.

A keycode has a format : KZ 12 8506 2190 +05

where :

KZ	Manufacturer code - KZ is Kodak
12 8506	Prefix identifies film roll
2190	The count is 4 digits that increment once per foot (35mm film, 4 perf = 16 x 4 perfs per frame)
+05	Offset - how many perforations the frame is from the keycode mark

Using the *count* and *offset* values we can calculate the frame location, as long as we know how many perforations there are per frame and per count.

The DPX file format includes *keycode* in the file header.

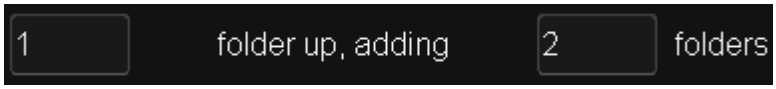
Automatic Naming

Some parts of the application assign names to items such as library material or folders based on a set of predefined rules. These rules are defined in the application preferences Capture/Conform tab.

These rules are used for :

- Auto assign name
- Auto create library folder
- Library tape name

Both *Auto assign Name* and *Auto create library folder* use the following interface convention when building a filename/folder structure :



i.e. ***M folders up, adding N folders***

The settings here control the creation of a *name* string based on the **filename/folder structure** on disk. The resulting string can be used as a name, or part of a name, of an item in a project library.

Basic Name String

Consider the example file and folder structure :

```
five  /  four  /  three  /  two  /  one  / clip.0001.dpx
```

The filename is "clip" inside folder "one".

> Note that the application considers the filename as "clip", ignoring the file numbers (0001) and extension (.dpx).

We start by going :

M folders up :

```
five  /  four  /  three  /  two  /  one  / clip.0001.dpx
|        |        |        |       |      |
5 up     4 up     3 up     2 up    1 up   0 up
```

Where we end up, we then:

add N folders (such that we try and end up with N folders) :

Calculation	Basic Name String	Note
4 up, adding 2	`four three`	
2 up, adding 1	`two`	
2 up, adding 3	`two one`	no more folders
1 up, adding 2	`one`	no more folders
0 up, adding 2		empty (no folders)

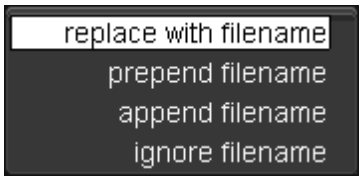
The result here can be used as a *name*, or as part of a name.

How we use this resulting basic name, and whether we use it at all, depends on other parameters.

Auto Assign Name

The *Auto Assign Name* parameter in the Capture/Conform preference tab, defines what *Material Name* we give imported files/sequences inside the project library.This name is extracted from the file name and/or folder structure according to rules defined here.

Once we have our basic *name string* described above, we determine its use via a drop-down selector of :



- replace with filename - this setting does not use the basic string we calculated above
- prepend filename
- append filename
- ignore filename

These settings control whether we combine our basic string with the actual filename when creating the library material name (apart from the *replace with filename* setting).

For our **first resultant basic string** calculated above :

Calculation	Basic Name String	Note
4 up, adding 2	`four three`	

We end up with :

Choice	Material Name result	Note
replace with filename	`clip`	Use filename only, ignore above calculation
prepend filename	`clip four three`	
append filename	`four three clip`	
ignore filename	`four three`	throw filename away

Auto Assign Library Folder

This setting defines whether we create named library folders automatically on material import. The folder names are created according to rules defined here.

Once we have our basic *name string* described above, we determine its use via a drop-down selector of :

- no auto folder
- tape name
- filename
- filename hierarchical

Note that if we choose *no auto folder*, the name calculations detailed below are not used and any imported material is imported into the *current* folder.

The folder string constructed is only used for the settings *filename* and *filename hierarchical* .

See the chapter on Capture/Conform preferences for details.

If tape name is selected, a library folder is created and named as per the tape name extracted from the file or its path.

Tape Name

The *tape name* field in the library can be assigned from both the file header and the file path.

If we take the *tape name* from the file path, our choice is a single value extracted from the filename/filepath :

M folders up e.g.

Example :

```
five  /  four  /  three  /  two  /  one  / clip.0001.dpx
|        |        |        |       |      |
5 up     4 up     3 up     2 up    1 up   0 up
```

Result :

Folders Up	Tape Name Result	Note
0	`clip`	Use filename at level 0
1	`one`	
2	`two`	

Effect Identifiers

Effect Identifiers are *unique* names for application effects and are used to uniquely specify an effect in the *general.prefs* preference file.

Master layer

The following table lists the effects available for the master layer and their corresponding IDs in the general.prefs file:

Effect Tree Name	Effect ID
saturation	Saturation
printer	PrinterLights
lift gamma gain	LiftGammaGain
balance	Balance
col curves	DifferentialColorCorrect
bright contrast	BrightnessContrast
bright regions	BrightnessRegions
soft clip	SoftClip
saturation	Saturation
pan scan	n/a, always available

Base layer

The following table lists the effects available for the base layer and their corresponding IDs in the general.prefs file:

Effect Tree Name	Effect ID
matte	n/a, isolation always available
keyer	n/a, isolation always available
shapes	n/a, isolation always available
matte blur	n/a, isolation always available
hue curves	HueCurves
printer	PrinterLights
lift gamma gain	LiftGammaGain
balance	Balance
col curves	DifferentialColorCorrect
bright contrast	BrightnessContrast
bright regions	BrightnessRegions

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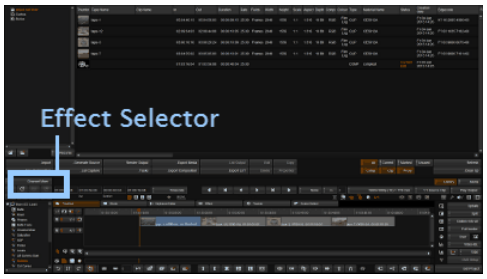
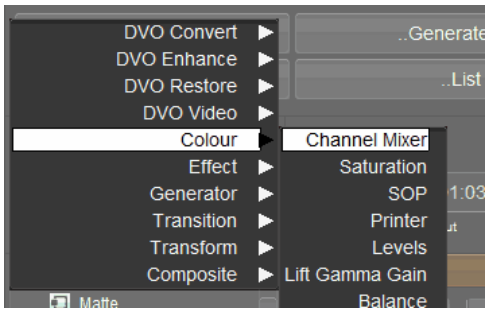
soft clip	SoftClip
HLS	HLSColorCorrect
blur	Blur

Effect Selector Configuration

The *Effect Selector* is the drop-down list that displays all available effects. These can be selected and added to a segment on the current composition.



The Effect Selector drop-down list.



Interacting with the Effect Selector drop-down list and choosing an effect to add to the current composition.

Effects are placed within *Effect Groups*. Above, we see the group *Colour* containing the effects *Channel Mixer*, *Saturation*, *SOP* and other tools.

The **order** of the top-level effect groups, the effects within each group and the order the effects appear inside a group are controlled by configuration files.

Configuration Files

There are two possible configuration files.

One is the *default* configuration and exists in the application C:\Nucoda\2014_1\root. The other *user* file will override the defaults **if you create it** and place it in the same folder. By default, this *user* configuration file does not exist.

Default Configuration File

Name :	`defaultEffectList.prefs`
Location :	C:\Nucoda\2014_1\root

This is the main configuration file for the drop-down list and defines the effect groups and the effects that appear in each group by default.

> **!** Do not edit or modify this file. It will be **over-written** every application install. If you want to modify the effect selector, edit the *userEffectList.prefs* file.

User Configuration File

Name :	`userEffectList.prefs`
Location :	C:\Nucoda\2014_1\root

This file does not exist by default.

If it exists, it will *over-ride* the default settings in the *defaultEffectList.prefs* file.

An example *userEffectList.prefs* file exists in the *example_files* folder.

Configuration File Format

A high-level overview of the file format is shown below :

```
effectList
[
    // These effects appear in top-level
    effects "effect1" "effect2"

   // Multiple "GROUPS" allowed
    GROUP
    {
        // As displayed as menu name
        name "NAME"
        // As appearing in sub-menu
        effects "effect1" "effect2"
    }

   // Add more effects to top-level here
    effects "effect3" "effect4"

   // or false. Insert default effects?
    insertDefault true

   // Do not show these effects
    Hidden
    {
        effects "effectA" "effectB"
    }
]
```

Note that the entire *effectList* content is wrapped in **SQUARE** ([,]) brackets.

effects

List effects to use (to display, or to hide).

- Each is quoted and separated with spaces.

- The effect names used are the "effect id". You can list all the "effect id"'s by running the application with the argument `--effect-ids` e.g.

```
cd \Program Files\Nucoda\2014_1\
nucoda_fuse.exe --effect-ids
```

- You can have multiple "effects" lines.
- You can use multiple "effects" tags.
- An "effects" tag at the top-level is displayed at the top-level of the Effect Selector. An "effects" tag in a GROUP is displayed within the named ("name") GROUP.

Example :

```
effects "Blur" "ChannelExtract" "Saturation"
```

GROUP

A GROUP groups a set of effects together as a unit with a "name".

- The "name" will be displayed in the GUI.
- The listed effects are given inside the "effects" tag within the GROUP.
- You can have multiple GROUP sections.

Example :

```
MainEffects
{
  effects "Blur" "ChannelExtract" "Saturation"
}
```

insertDefault

This tag will insert the default effects list (in its entirety) where this tag is placed.

- true - Insert the default effects list. The list inserted is as per the *defaultEffectList.prefs* file and inserted where this tag is placed.
- false - Do not insert the default list of effects. This may have the effect of minimising and simplifying the effects list.

If "insertDefault" is omitted, this is equivalent of "insertDefault true" being added at the end.

Example :

```
insertDefault true
```

Hidden

Hide the effects set in the "effects" list given.

- This means they do not appear *anywhere* in the *Effect Selector*, even if placed in a GROUP or a top-level "effects" list.
- This means they cannot be added.

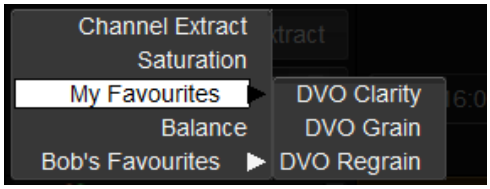
Example :

```
Hidden
{
  effects "FieldSwap" "LiftGammaGain"
}
```

Example Configuration

The example shown below will result in an Effect Selector drop-down that looks like :

```
Channel Extract
Saturation
My Favourites >
    DVO Clarity
    DVO Grain
    DVO Regrain
Balance
Bob's favourites >
    DVO Dust+Fix
    DVO Fix
    DVO Flicker
```




```
effectList
[
    effects "ChannelExtract" "Saturation"

    MyFavorites // This is a comment
    {
        name "My Favourites"
        effects "DvoClarity" "AGR4" "DvoRegrain"
    }

    effects "Balance" "Saturation"

    BobsFavorites
    {
        name "Bob's Favourites"
        effects "Dust+Fix" "Deblotch" "DvoDeflicker"
    }

    insertDefault false

    Hidden
    {
        effects "FieldDomCorrect" "FieldRemove" "FieldSwap"
    }
]
```

Output Format Confguration

Every project a main output format defined and may also have one or more secondary formats configured. Available formats appear as a drop-down list on the project screen with a name *Setup*.

The Output Format Selector drop-down list.

Interacting with the Output Format Selector drop-down list and choosing a format.

The output formats available can be defined through the use of text configuration files.

Configuration Files

The *default* configuration file exists in the application C:\Nucoda\2014_1\root.

If a *user* configuration file exists in the same folder it will override the defaults. This user configuration file does not exists unless you **create it**.

Default Configuration File

Name :	`defaultOutputFormats.prefs`
Location :	C:\Nucoda\2014_1\root

This is the main configuration file for the drop-down list and defines the *standard* output formats available.

> **!** You should not edit or modify this file. It will be **over-written** by every application install. If you want to modify the format list, edit the *userOutputFormats.prefs* file.

User Configuration File

Name :	`userOutputFormats.prefs`
Location :	C:\Nucoda\2014_1\root

This file does not exist by default.

If it exists, it will *over-ride* the default settings in the *defaultOutputFormats.prefs* file.

An example *userOutputFormats.prefs* file exists in the *example_files* folder.

Configuration File Format

A high-level overview of the file format is shown below :

```
outputFormats
[

    // Multiple formats allowed
    FORMATNAME  // Must be unique
    {
        name "<Format Name>"      // as displayed
        size N N                  // X Y pixels
        aspect W H                // Rational aspect
        fps N N                   // Rational FPS
        fieldOrder <FIELD ORDER>  // See below
        dropFrame <Boolean>
        initial <Boolean>         // Optional - see below
    }

    FORMATNAME2  // Must be unique
    {
        name "<Format Name>"      // as displayed
        size N N                  // X Y pixels
        aspect W H                // Rational aspect
        fps N N                   // Rational FPS
        fieldOrder <FIELD ORDER>  // See below
        dropFrame <Boolean>
        initial <Boolean>         // Optional - see below
    }

    insertDefault <Boolean>       // insert default list?

]
```

Note that the entire *outputFormats* content is wrapped in **SQUARE** ([,]) brackets.

Definitions

Some configuration file parameters are of a specific *type* :

Rational :	A *Rational* number is a *fraction* and is composed of a *numerator* (top) and a *denominator* (bottom). Rather than using a floating point number (and decimal places), a rational number can more accurate reflect a parameter such as *aspect ratio*, or *frames per second*.
Boolean :	A *Boolean* value is either *true* or *false*.

Sections

FORMATNAME

Type : Identifier

Each output format definition is grouped (using curly braces), and *named.* These names :

- Must be *unique*
- Must not contain spaces (Only : a-z,A-Z,0-9,_,-)

These names are not related to the user visible *name* field used inside the format definition and can be different.

Example :

```
Main_Feature_2800x1800_Test
{

}
```

name S

Type : String

This is the user visible display name for the format. It is a string wrapped in double-quotes ("") and can contain spaces.

Example :

```
name "2800 x 1800 Test"
```

size W H

Type : Rational

The *size* parameter specifies the pixel *width* and *height* as a *rational* number.

Example :

```
size 2800 1800
```

aspect N M

Type : Rational

The *aspect* parameter specifies the aspect ratio as a *rational* number (fraction with a *numerator* and a *denominator).*

A 1:1 aspect can always be chosen by setting the *aspect* values the same as the *size* values.

Example :

```
aspect 37 20  // 1.85
```

fps N M

Type : Rational

The fps parameter specifies the frames per second as a rational number.

Example :

```
fps 2997 100  // i.e. "29.97"
```

fieldOrder S

Type : String

The *fieldOrder* parameter specifies how to interpret a frame in the format. It is a string wrapped in double-quotes ("") and can take values :

InterlacedUpper	Format uses interlaced frames (fields) with upper field dominant.
InterlacedLower	Format uses interlaced frames (fields) with lower field dominant.
Progressive	Format is not fielld based.

Example :

```
fieldOrder "Progressive"
```

dropFrame B

Type : Boolean

The *dropFrame* parameter specifies if the format uses drop-frame timecode (*true*) or not (*false*).

Example :

```
dropFrame false
```

initial B

Type : Boolean

This parameter is optional.

The *initial* parameter specifies that the format it appears in will be *selected* on application start (for a completely fresh installation).

Example :

```
initial true
```

insertDefault B

Type : Boolean

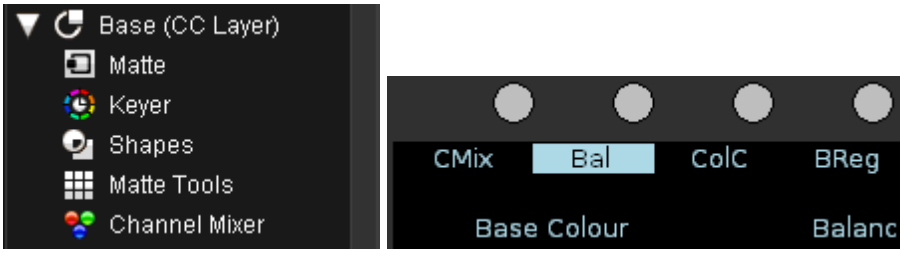
The *insertDefault* parameter can be used in a *user* configuration file (userOutputFormats.prefs) to load in the default output formats (a specified in the defaultOutputFormats.prefs file) at the location the directive appears.

This parameter must be placed outside any actual format definition section.

Example :

```
insertDefault true
```

Colour Tool Order



Colour tools are effects such as *Keyer*, *Channel Mixer*, *RGB Curves* and *SOP*. They exist inside the *Master* and *CC Layers.*

The default order of the tools can be changed in both the GUI and the Control Panel by editing the main application preference file *general.prefs :*

C:\Nucoda\2014_1\root\general.prefs

The recommended way to change the tool order is via the utility program Preferences Assistant. Always make a **backup** if you choose to edit the *general.prefs* directly.

GUI Tool Order

Two preference file options set the tool order :

- `defaultRealTimeEffectIDs` - **Master Layer** tool order
- `defaultSecondaryCCEffectIDs` - **Base** and **CC Layer** tool order

Format

Note that each option should be on a single line in the preference file.

Some tools **must stay in the default position in the layer**. These are identified in **red**.

```
defaultRealTimeEffectIDs "ChannelMixer" "Saturation"
  "SlopeOffsetPower" "PrinterLights"
  "LiftGammaGain" "Balance" "RGBMLevels"
  "DifferentialColorCorrect" "BrightnessContrast"
  "BrightnessRegions" "RGBMCurves"
  "SoftClip" "Saturation"

defaultSecondaryCCEffectIDs "ChannelMixer" "Saturation"
  "SlopeOffsetPower" "PrinterLights" "LiftGammaGain" "Balance
  "RGBMLevels" "DifferentialColorCorrect" "BrightnessContrast
  "BrightnessRegions" "RGBMCurves" "SoftClip" "HueCurves"
  "HLSColorCorrect" "Blur"
```

Control Panel Tool Order

Two preference file options are in the "panel" section :

- `defaultMasterFX` - **Master Layer** tool order
- `defaultLayerFX` - **Base** and **CC Layer** tool order

Format

Note that each option should be on a single line in the preference file.

```
defaultMasterFX "CMix" "Bal" "ColC" "BReg" "Clip"
  "SOP" "Lev" "RGB"
defaultLayerFX "CMix" "Bal" "ColC" "BReg" "HCurv"
  "Clip" "SOP" "Lev" "RGB" "None" "HCurv" "HLS"
```

The *Valhall Control Panel* has space for six options on the display at once. Use the string "None" to designate a *space* on the panel display.

3D LUT File Format

LUT format v3 extends support to *High Dynamic Range* (HDR) images (e.g. *OpenEXR*) and allows the transformation of extended range inputs. This means LUT data values can exist outside the range 0.0 to 1.0.

Example LUT files are distributed in the folder :

```
C:\Nucoda\2014_1\root\cms\
```

In addition, example C programs are included to generate sample LUT files. These are found in the *Example Code* folder alongside some sample program outputs.

- **v2 format** code example :
  `Example Code\Lut3D.cpp`
- **v3 format** code example :
  `Example Code\Lut3Dv3.cpp`

The Nucoda 3D LUT file format is ASCII text with a .cms file extension.

The file is composed of :

- 1D x 3 floating point LUT and a
- 3D x 3 floating point LUT

The LUT file can contain a 1D LUT, a 3D LUT or both. If both, the 1D LUT definition should be *before* the 3D LUT definition.

Setup

The following parameters are used in the LUT file before the LUT data is defined :

TITLE

Format : STRING

LUT title. Use quotes if the title contains spaces.

Example :

```
TITLE "Title of LUT"
```

NUCODA_3D_CUBE

Format : INT

Integer format version of LUT file.

Example :

```
NUCODA_3D_CUBE 3
```

LUT_1D_SIZE

Format : INT

Size of 1D LUT.

Example :

```
LUT_1D_SIZE 1024
```

LUT_1D_INPUT_RANGE

Format : FLOAT FLOAT

Minimum and maximum 1D input values allowed: `min1D max1D`
Optional (defaults to 0.0 1.0).
LUT Format v3 Only

Example :

```
LUT_1D_INPUT_RANGE 0.0 1.0
```

LUT_3D_SIZE

Format : INT

Size of 3D LUT.

Example :

```
LUT_3D_SIZE 17
```

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LUT_3D_INPUT_RANGE

Format : FLOAT FLOAT

Minimum and maximum 3D input values allowed: `min3D max3D`
Optional (defaults to 0.0 1.0).
LUT Format v3 Only

Example :

```
LUT_3D_INPUT_RANGE -1.000 4.000
```

Note that *min1D* and *max1D* are the minimum and maximum **input values** that can be transformed by the 1D LUT. Similarly for the 3D LUT and min3D and max3D input values.

Input values outside these ranges are *clipped* to these ranges before lookup. There is no constraint on the LUT outputs.

The LUT data is specified after the header setup.

1D LUTS

A single 1D array per R,G and B component.

The LUT values will range between min3D and max3D.

Earlier LUT versions use a different range : v1 is between 0 and M, v2 is normalised between 0 and 1.

In the file this is expanded into a single list of r,g,b triples ....

3D LUTS

The 3D LUT is an **MxMxM** array.

In the file this is expanded into a single list of r,g,b triples with red the fastest moving axis, then green, then blue.

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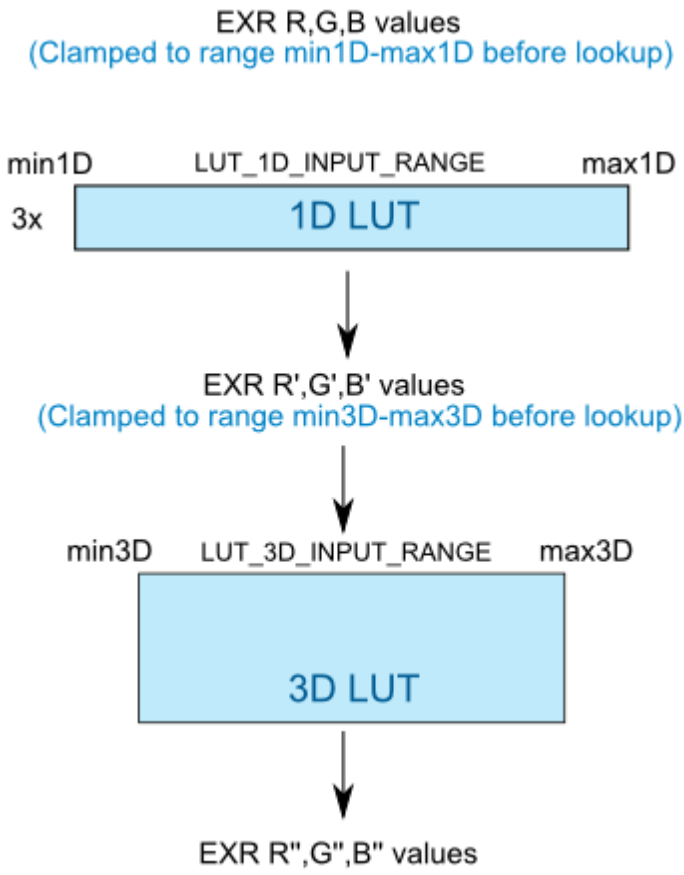
An example of the RGB values in an EXR pipeline is shown in the diagram below :



Example EXR RGB values pipeline.

File Format

From a sample file included : lut3d_2xN_noinvert_1D_only.cms

```
# Lut3D.exe <1D-size> <3D-size> <invert-green> <1d-3d-test>
# see Lut3D.cpp for details on optional arguments

NUCODA_3D_CUBE 2

TITLE "Identity Lut, 1D Only, Version 2 format"

LUT_1D_SIZE 2

0.000000  0.000000  0.000000
1.000000  1.000000  1.000000
```

Comments start a line with '//' or '#' characters.

Format Description

```
// version, title and sizes of LUTs:

NUCODA_3D_CUBE version-number:int // version number

TITLE "colour-conversion-title:string" // optional title (in quotes)

LUT_1D_SIZE size-of-1D-LUTs:int // call this N
LUT_1D_INPUT_RANGE min1D:float max1D:float // optional

LUT_3D_SIZE number-of-levels-per-axis-in-3D-LUT:int // call this M
LUT_3D_INPUT_RANGE min3D:float max3D:float // optional

// specify 1D LUT: comes directly after the header specifications
red[0]:float green[0]:float blue[0]:float
red[1]:float green[1]:float blue[1]:float
red[2]:float green[2]:float blue[2]:float
...
...
red[N-1]:float green[N-1]:float blue[N-1]:float

// specify 3D LUT: comes directly after 1D LUT specification
// R lvl 0, G lvl 0, B lvl 0
red[0,0,0]:float green[0,0,0]:float blue[0,0,0]:float
// R lvl 1, G lvl 0, B lvl 0
red[0,0,1]:float green[0,0,1]:float blue[0,0,1]:float
// R lvl 2, G lvl 0, B lvl 0
red[0,0,2]:float green[0,0,2]:float blue[0,0,2]:float
...
...
// red level M-1, green level 0, blue level 0
red[0,0,M-1]:float green[0,0,M-1]:float blue[0,0,M-1]:float
// R lvl 0, G lvl 1, B lvl 0
red[0,1,0]:float green[0,1,0]:float blue[0,1,0]:float
// R lvl 1, G lvl 1, B lvl 0
red[0,1,1]:float green[0,1,1]:float blue[0,1,1]:float
// R lvl 2, G lvl 1, B lvl 0
red[0,1,2]:float green[0,1,2]:float blue[0,1,2]:float
...
...
// red level M-1, green level 1, blue level 0
red[0,1,M-1]:float green[0,1,M-1]:float blue[0,1,M-1]:float
// R lvl 0, g lvl 2, B lvl 0
red[0,2,0]:float green[0,2,0]:float blue[0,2,0]:float
// R lvl 1, G lvl 2, B lvl 0
red[0,2,1]:float green[0,2,1]:float blue[0,2,1]:float
// R lvl 2, G lvl 2, B lvl 0
red[0,2,2]:float green[0,2,2]:float blue[0,2,2]:float
...
...
// red level M-1, green level M-1, blue level 0
red[0,M-1,M-1]:float green[0,M-1,M-1]:float blue[0,M-1,M-1]:float
// R lvl 0, G lvl 0, B lvl 1
red[1,0,0]:float green[1,0,0]:float blue[1,0,0]:float
// R lvl 1, G lvl 0, B lvl 1
red[1,0,1]:float green[1,0,1]:float blue[1,0,1]:float
// R lvl 2, G lvl 0, B lvl 1
red[1,0,2]:float green[1,0,2]:float blue[1,0,2]:float
...
...
// red level M-2, green level M-1, blue level M-1
red[M-1,M-1,M-2]:float green[M-1,M-1,M-2]:float blue[M-1,M-1,M-2]:floa
// red level M-2, green level M-1, blue level M-1
red[M-1,M-1,M-2]:float green[M-1,M-1,M-2]:float blue[M-1,M-1,M-2]:floa
```

Icon Tools Reference

File Browser Navigation

icon	function
	User preset directories - Opens the preset directories configuration panel
	Back to previous directory - Navigate backwards by one folder level
	Directory rename - Renames the selected folder
	Add folder - Adds a new folder as a sub directory of the current one
	Open / Close Panels - Opens/closes the multiple panel display
	Move panels right - Navigates forwards through multiple panels
	Move panels left - Navigates backwards through multiple panels

Library Folders

icon	function
	Add Folder - Creates a new folder in the Library
	Remove Folder - Removes the selected folder from the library
	Folder - Depicts a Library folder
	Caches Folder - Depicts the Caches folder in the library
	Tree Expand - Expands the Tree branch being viewed
	Tree Close - Closes the Tree branch being viewed

Playback Tools

icon	function
	Step Back a frame
	Jump to previous edit point
	Play backwards - Toggle, plays backwards, then stops
	Play forwards - Toggle, plays forwards, then stops
	Jump to next edit point

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	Step Forward a frame
	Scene Detect - Applies scene detection on next playback

Viewer Tools

icon	function
	Apply monitor Aspect Ratio correction
	Show Video Fields - Shows individual video fields of interlaced footage
	Show monitor Overlay tools
	View Full Screen
	Reference Lock
	Compare Mode
	Show HUD (Head Up Display)
	Show Grid
	Show Mask
	Edit Mask
	Show Graph Curves
	Show Histogram
	Reset Histogram
	Apply CMS
	Show monitor output
	Show video output

Shape Transform Tools

icon	function
	Translate
	Rotate
	Scale

	Invert

Tracker Tools

icon	function
	Track Forward - Plays through the shot tracking as it goes
	Track Backwards - Plays backwards through the shot tracking as it goes
	Track Step Forward - Tracks forward one frame
	Track Step Backwards - Tracks backward one frame

Format Support

The following sections describe media formats supported by the main application.

Image Formats

DPX

Digital Moving Picture Exchange (SMPTE 268M)
Extensions : dpx

Read / Write
Optimised for realtime playback

Options :

Mode	Big-endian (default) / Little-endian
Depth	10 bit RGB / 12 bit RGB / 10 bit YUV

The DPX format is **optimised for realtime playback** and includes support for *alpha channels*. It is the native format for cache renders and source proxies in 10 bit projects (default).

Cineon

Cineon File Format
Extensions : cin

Read / Write

Options : None

TIFF

Tagged Image File Format
Extensions : tiff tif

Read / Write

Options :

Bit Depth	8 / 16 bit

SGI

SGI Image Format
Extensions : sgi rgb

Read / Write

Options :

Compression	None / RLE
Bit Depth	8 / 16 bit

JPEG

JPEG Image Format
Extensions : jpg jpeg

Read / Write

Options :

Quality	0-100% (default : 75)

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PIC

Softimage PIC Format
Extensions : pic

Read / Write

Options :

Compression	None / RLE

MPEG

MPEG-1 Video
Extensions : mpg mpeg

Read / Write

Options :

Width/Height	Slider
I-Frame Interval	0-10 (default : 8)
Bitrate (Kb/s)	Slider (default : 400 Kbps)
Tolerance (%)	Slider

See the MXF Formats section.

MXF

Material Exchange Format
Extensions : mxf

Read / Write

Options :

Codec	Availability is output format dependant
Avid Project Name	From MXF File / From DV Project / User Set

See MXF Formats section.

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EXR

OpenEXR High Dynamic Range Format
Extensions : exr

Read / Write

Options :

Compression	None / RLE / ZIPS / ZIP / PIZ / PXR24 / B44 / B44A

The EXR format is based on the industry standard OpenEXR format [1]. It is the default cache format for **half-float** projects.

For *optimal* performance reading and writing EXR files to/from disk on the Windows NTFS filesystem, EXR frames should be **padded** to an NTFS *volume sector size*. This is usually 512 bytes but may be different on some systems (e.g. padding to 4096 or 16384 bytes).

[1] For details on *OpenEXR*, see the web site at http://www.openexr.com. OpenEXR is trademarked by Lucasfilm Ltd.

Quicktime

Apple Quicktime Format
Extensions : mov

Read / Write

Supported as per installed and configured codecs.

Support includes Avid DNxHD.

List Formats

EDL

This is the *Edit Decision List*.

CMX3600 Standard Format

Support :

- Dissolves
- Retimes
- Black (BL) and AUX (AX) events

EDL export (*Export Composition*) supports both standard CMX3600 format and an **extended EDL format** that includes :

- Long tapenames
- Clipname detail
- File path detail per event.

Comment fields are parsed for *clipname* and event *material* (file path) information.

Clip Names

If an event followed by a clip-name specifier e.g.

```
* FROM CLIP NAME: test_gh56
```

Then the event is loaded and the clip is created with a clip-name as specified.

File Load

If an event is followed with a file path e.g.

```
* FROM FILE: C:\media\film_cc_scans.007882.dpx
```

Then the event material will be loaded into the library if we enable the following on EDL import :

Import material from file paths

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See the Export Composition chapter for details of EDL export options.

AAF

This is the *Advanced Authoring Format*.
Extensions : aaf

Read / Write (see note below)

Options :

Format	See MXF Formats section.
Export to Interplay	Off / On (default : off)

Exporting an AAF requires the composition to have been created from an imported AAF.

CUT

This is a film cut list file.

Extension : .cut

Format

We **expect** a line :

```
The cut list in construction order
```

We **expect** a line after this (skipping empty lines and comments) that starts with the word :

```
Shot
```

We **skip** :

- lines that start with a string of asterisks (*).
- blank lines.

A *Title* line becomes the title of the created composition.

This is a fixed format text file with the following fields (index from 0 (zero)) :

Field	Start	Length
Shot	0	5
Footage (Rec Start)	5	7
Length (Rec Length)	14	7
Keycode	24	10
In Frame (Src In)	36	7
Out Frame (Src Out)	46	7
Roll	57	10

Example CUT File

This is taken from the release distribution and the examples folder :

C:\Nucoda\2014_1\example_files\cut\

```
Title: Cutlist test
*****************************************************************
The cut list in construction order:
Shot Footage  Length    Keycode     In Frame  Out Frame  Roll
001  0000+00  0000+08   KM 16 1825  4582+08   4582+12    002
002  0000+08  0000+06   KM 41 2976  3884+00   3884+06    004
003  0000+14  0000+05   KU 25 1490  2105+02   2105+07    007
004  0001+03  0000+10   KM 18 0863  0044+00   0044+10    025
005  0001+13  0000+10   KU 09 8386  2901+07   2902+01    030
006  0002+07  0007+12   KM 46 9745  0513+00   0520+12    050
*****************************************************************
```

ALE

This is the *Avid Log Exchange* format.
Extensions : ale

The ALE format is export only.

The ALE format is an ascii text format used by Avid editing systems for metadata interchange.

Generate an ALE file for the current composition via the ***..Export Composition*** button. Choose *ale* as your export format.

The ALE format is ascii text and usually tab-delimited (delimiters are specified in the header). It consists of :

- A *header* containing various global settings (e.g. project format, fps etc.)
- A column specification
- One or more lines encoding metadata for a *shot*

Header

```
Heading
FIELD_DELIM<TAB>TABS
VIDEO_FORMAT<TAB>PAL
FPS<TAB>25
```

Column Specification

```
Column
Name<TAB>FPS<TAB>Project<TAB>Tape<TAB>Start<TAB> ... <TAB>
ASC_SOP
```

Fields :

- Name
- FPS
- Project
- Tape
- Start
- End
- Duration
- Tracks
- SourceId
- Take
- Scene
- Slate
- Camroll
- Director
- SoundRoll
- ProjectName
- DoP
- Cameraman
- DailiesColorist
- DateOfShoot
- ASC_SAT
- ASC_SOP

Content

```
Data
<shot1>
<shot2>
...
```

Each shot includes and encodes the fields as shown above. Each field in each shot is delimited as per the header specification (e.g. usually a TAB).

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MXF Formats

Read Support

Codec	On Avid	Format	Bits	Notes
DV25	DV 25 MXF	720x576 50i 720x486 59.94i	8	[1]
DV50	DV 50 MXF	720x576 50i 720x486 59.94i	8	[1]
DVCPRO100	DVCPRO HD MXF	720p 59.94 1080i 50	8	[2]
MPEG IMX30	MPEG 30 MXF	720x576 50i 720x486 59.94i	8	[3]
MPEG IMX 40	MPEG 40 MXF	720x576 50i 720x486 59.94i	8	[3]
MPEG IMX 50	MPEG 50 MXF	720x576 50i 720x486 59.94i	8	[3]
DNxHD 40	DNxHD 36 MXF	1080p25	8	[5]
DNxHD 36	DNxHD 36 MXF	1080p 23.98 1080p 24	8	
DNxHD 115	DNxHD 115 MXF	1080p 23.98 1080p 24	8	
DNxHD 120	DNxHD 120 MXF	1080i 50	8	
DNxHD 145	DNxHD 145 MXF	1080i 59.94 720p 59.94	8	
DNxHD 175	DNxHD 175 MXF	1080p 23.98 1080p 24	8	
DNxHD 175X	DNxHD 175 X MXF	1080p 23.98 1080p 24	10	
DNxHD 185	DNxHD 185 MXF	1080i 50	8	
DNxHD 185X	DNxHD 185 X MXF	1080i 50	10	
DNxHD 220	DNxHD 220 MXF	1080i 59.94 1080p 29.97 720p 59.94	8	
DNxHD 220X	DNxHD 220 X MXF	1080i 59.94 1080p 29.97 720p 59.94	10	
2:1 / 3:1 Compressed	2:1i / 3:1i	PAL / NTSC	8	
Uncompressed 1:1	1:1 MXF 1:1 10b MXF	720x486 720x576 HD 1920x1080	8/10	[4]

[1] DV25/DV50. For NTSC DV, sample height is actually 480. These formats are DVPRO, not consumer DV (4:2:0).

[2] DVPRO100. The 1080 i50 format is actually sampled 1440x1080.

[3] IMX. Samples are actually 16 lines greater (vertical blanking), making the formats 720x608 and 720x512.

[4] Actually a YUV 4:2:2 format. Will offer a 10 bit version if using 10 bit output depth.

[5] Avid will treat and label DNxHD 40 as DNxHD 36.

Sony XDCAM

Format	Codec
XDCAM SD	DVCAM 4:1:1/4:2:2 25 Mbps
XDCAM SD	MPEG IMX 30/40/50 Mbps 4:2:2

Camera Formats

Red

The Red digital camera format.
Read only

Extension : .R3D

See the Red chapter for details.

ARRI D-21

The *ARRI D-21* camera is an advanced digital camera from ARRI. The camera has a 3K sensor and generates ARRIRAW data (an uncompresssed 12 bit RAW format) as well as a variety of HD output formats.

Read only.

Extension : .ari

> We support the **.ari (ARRIRAW) file format only.**

Timecode

The *timecode* can be retrieved from :

- The file *header* **or**
- The *filename*.

Tapename

The *tapename* is from **filename only**.

> Care needs to be taken when using a standard EDL due to tapename length and character restrictions.

Resolution

Frames are 2880x2160 pixels native.

LUT

A LUT is important in an ARRI D-21 workflow.

We include a standard set of ARRI LUT files in our cms folder :

`C:\Nucoda\2014_1\root\cms\ArriD21-LUTS\`

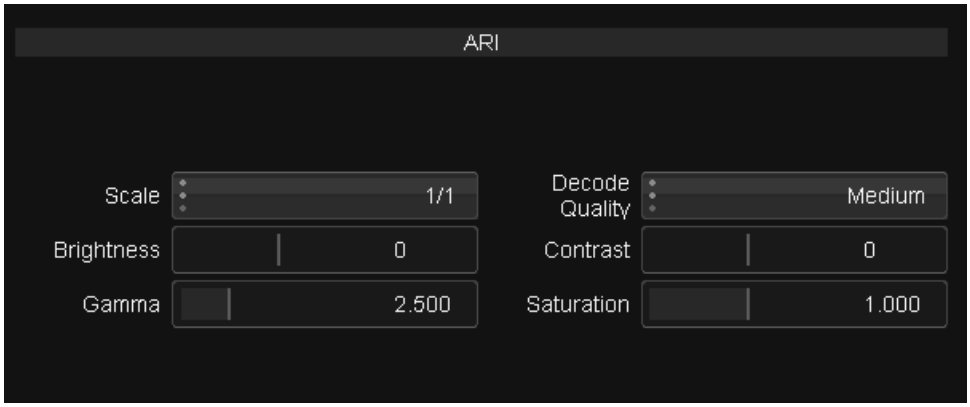
You can also download LUT files directly from ARRI by going to the URL :

http://www.arridigital.com/technical/luts/

Properties

..Properties

The application exposes the following shot properties via the *Library/ Properties* dialog.



Scale

Set the resolution we decode to.

Options

- 1/1
- 1/2
- 1/4
- 1/8

Decode Quality

Set the RAW camera data decode mechanism.

Options

- Low
- Medium

- High

Brightness

Slider : -100 to 100

Contrast

Slider : -100 to 100

Gamma

Gamma correction used to transform the camera data for display.

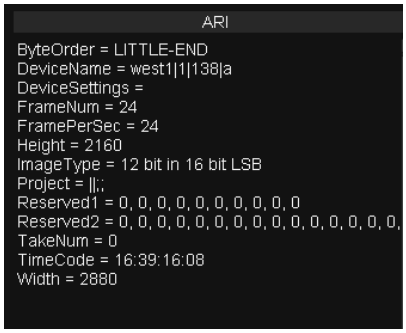
Slider : -0.1 to 10

Saturation

Slider : 0 to 2

Extra Metadata

All available metadata is also displayed in a raw format :



Silicon Imaging SI-2K

The Silicon Imaging SI-2K camera is an advanced 2K digital cinema compliant camera from Silicon Imaging Inc. The camera records directly to the *CineForm* RAW™ format.

Read only.

Extension : .mov

We support the SI-2K **.mov file format only.**

Timecode

The *timecode* can be retrieved from :

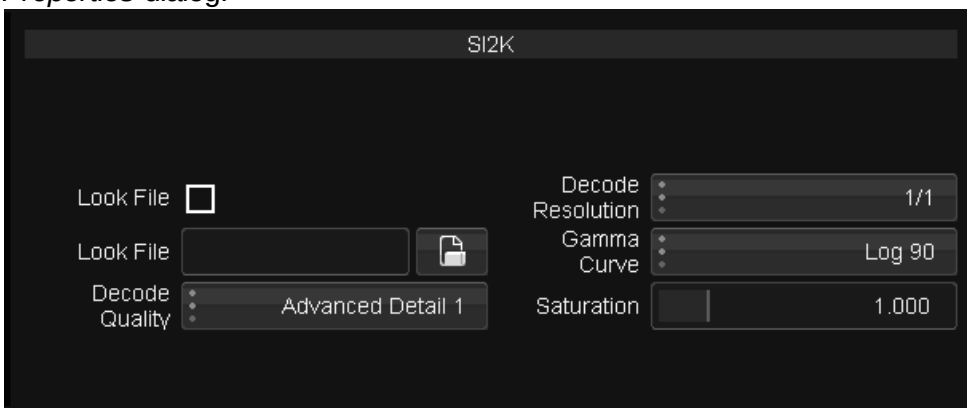
- The file *header* **or**
- The *filename*.

Tapename

The *tapename* is from **filename only**.

Properties

The application exposes the following shot properties via the *Library/ Properties* dialog.



Look File

The *Look File* option lets you select and enable an SI-2K *CineForm* RAW™ LUT file.

SI-2K Look Files have a **.look** extension.

To select a LUT, click on the file browser icon, navigate to your LUT file location and press *OK*. To apply the LUT, enable it via the *Look File* toggle :

SI-2K Look File LUTs have to be **installed** before use. See below.

Decode Resolution

Set the resolution we decode to.

Options

- 1/1
- 1/2
- 1/4

Decode Quality

Set the RAW camera data decode mechanism.

Options

- Automatic
- Advanced Bilinear
- Advanced Matrix5x5
- Advanced Smooth
- Advanced Detail 1
- Advanced Detail 2
- Advanced Detail 3

Gamma Curve

Gamma correction used to transform the camera data for display.

Options

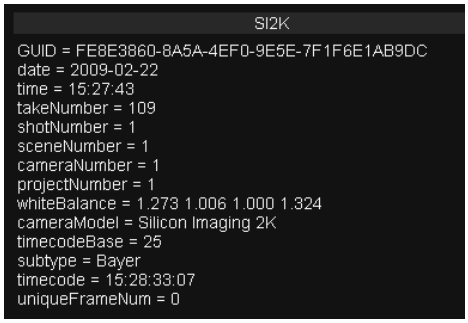
- Log 90
- Gamma 2.2
- Cineon 1.7
- Cine985 1.7
- Cineon 1.0
- Linear

Saturation

Slider : 0 to 4

Extra Metadata

All available metadata is also displayed in a raw format :



Installing Look File LUTs

SI-2K *CineForm* RAW™ Look File LUTs have to be **compiled and installed** before they can be used by the application.

> **!** If you do not install the .look files before trying to use them, you will get an error "Could not find .cflook file for selected look file."

The Look Files have a .look extension and are installed by a program called *LookInstaller.exe*.

To install :

- Open a Windows CMD shell : *Start / Run / Cmd*
- Type :
  `LookInstaller <file.look>`
  Where `<file.look>` is your chosen .look file.

On success, a dialog box opens and displays information e.g.

You can now use the installed LUT by selecting it in the Look File file selector in the shot *Properties*.

The *LookInstaller* program compiles the .look file and installs it as a *.cflook* file to the folder :

```
C:\Program Files\Common Files\CineForm\LUTs
```

To use the LUT, you can select either the original .look file or the installed .look file (in above folder).

Because the files are installed to the same location, **the names have to be unique**.

Vision Research Phantom

The *Vision Research Phantom* camera is an advanced digital camera supporting both RAW data and various HD output formats.

Read only

Extension : .cine

Timecode

The *timecode* is from file **header only**.

Timecode is calculated based on .cine file *Trigger Time* and the frame rate.

Tapename

The *tapename* is created based on :

- `<Camera Serial Number> + "CINE" + <6 Digit Date>`

This facilitates an easier conform/re-conform in a tape-less work-flow.

Properties

The application exposes the following properties specific to each *Phantom* shot via the *Library/Properties* dialog.

CINE Properties

Options

- CINE
- Custom

Scale

Set the resolution we decode to.

Options

- 1/1
- 1/2
- 1/4
- 1/8

Decode Quality

Set the RAW camera data decode mechanism.

Options

- Low
- Medium
- High

WB Red Gain

Slider : 0 to 2

WB Blue Gain

Slider : 0 to 2

Brightness

Slider : -100 to 100

Contrast

Slider : -100 to 100

Gamma

Gamma correction used to transform the camera data for display.

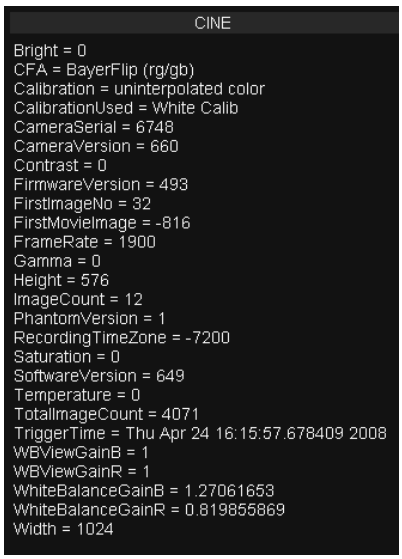
Slider : -100 to 100

Saturation

Slider : -100 to 100

Extra Metadata

All available metadata is also displayed in a raw format :



Audio Formats

WAV Audio

Uncompressed WAV audio files.
Extension : .wav

Broadcast WAV Audio

An extension to the WAV file format to include extra metadata.
Extension : .wav .bwf

Audio Interchange Format

The audio interchange format.
Extension : .aiff .aif .aifc

Compressed and uncompressed variants.

OFX Plugins

OFX is an Open Source standard for visual-effect plugins.

We support the full OFX API (Application Programming Interface) and a variety of plugins. Plugin support includes :

- The Foundry - *Tinder*, *Furnace* and *Keylight*
- GenArts - *Sapphire* (New)
- IMAGICA Corp. of America - *Primatte*

The OFX API and documentation can be found online :

http://openfx.sourceforge.net/

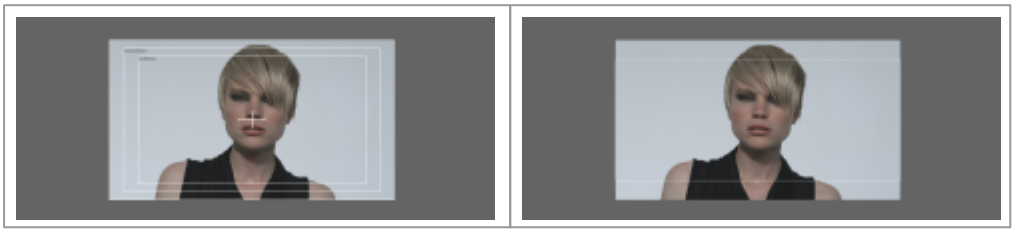
Configurable Viewer Tools

Viewer tools let you display various pieces of information and guide elements on top of your monitor image. This includes various metadata items, grids/ shapes, logos, masks and colour information graphs.

The following viewer tools are *user configurable* :

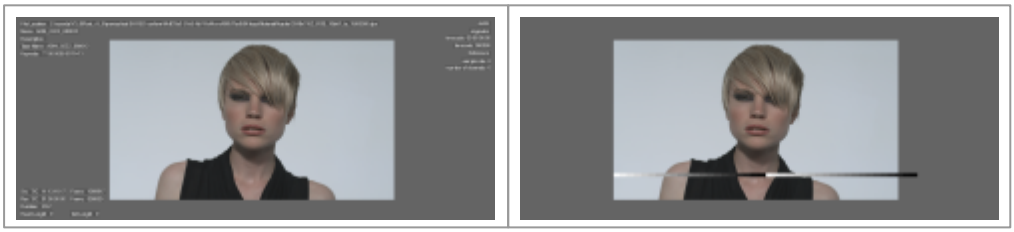
Grids

Overlay lines, rectangles and layout information.



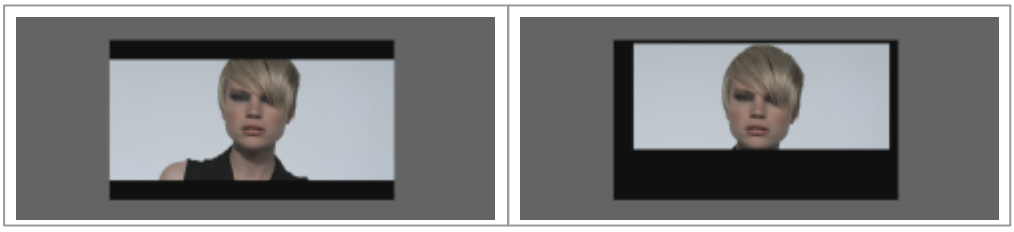
HUD (head Up Display)

Overlay text or graphics inside monitor area or image.



Masks

Mask/Blank areas of the image.



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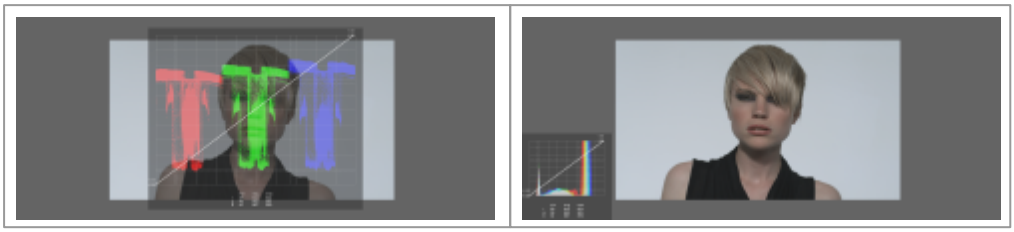
Graphs

Display a graph or histogram of image colour map.



The displayed information and its position can be customised via one or more ***specification*** files. The search path for the specification files is given in the main preference file *general.prefs*.

Configuration

Grids, HUDs, Masks and Graphs are configured via plain text files searched for in folders specified in the main configuration file *general.prefs*.

Parameter	Default	File Extension
monitorMaskDir	`monitorMasks/`	`.masks`
monitorGridDir	`monitorGrids/`	`.grids`
monitorGraphDir	`monitorGraphs/`	`.graphs`
monitorHeadUpDisplayDir	`monitorHUDs/`	`.grids`

Each specific parameter specifies a folder from which corresponding specification files will be loaded.

- Multiple specification files per folder will be loaded and aggregated
- Only files with the specified extensions are loaded
- Parameters can be repeated, specifying multiple folders to search
- Specification files located are **global** and available to all projects

Example

An example general.prefs line that specifies three folders to be searched :

```
monitorGrids "monitorGrids\" "\\server\testgrids\" "C:\Grids\"
```

Global Versus Project Specific

Specification files located inside folders described in the *general.prefs* file will be **global** and available to all projects.

Specification files can be kept **private** to a project by placing them inside a corresponding default named folder inside the project folder i.e.

`ProjectName/`**`monitorGraphs`**`/private.graphs`

Grids Specification

Overlay lines, rectangles and layout information.

The **HUD specification** also use Grid files (.grids) but with a location set as per the *general.prefs* `monitorHeadUpDisplayDir` parameter.

File Specification

- A grids file must end in the extension '**.grids**', e.g. test.grids
- It should be a plain text file

Each specification file specifies *one or more grids*, each identified by **unique name** (a *name* parameter).

Format

The grid file format is as follows :

```
monitorGrids 1.0 -1
{
  monitorGrid 1.0 -1
  {
    <grid specification>
  }

  monitorGrid 1.0 -1
  {
    <grid specification>
  }
  ...
}
```

The *grid specification* section is described below.

NOTE

- Grid specification lines must end with a *semi-colon* ";" character.
- A '#' character at line start delimits a **comment**. Rest of line is ignored.
- Strings should be **quoted** i.e. "string".
- There should be a **space** between each identifier and before the terminating semi-colon.

Grid Specification

The following identifiers are used.

name

```
name "<STRING>" ;
```

This is the name of the grid as shown in the GUI drop-down list.
Grid names should be unique.

units

```
units "<UNITS>" ;
```

where UNITS are :

pixels By default the coordinate system is ***absolute*** image pixels, lower left to top right.
Elements are drawn relative to the lower left corner of a pixel.

normalised Normalised coordinates map the range 0.0..1.0 to the monitor source full image pixel size in x and y.

unitsImageAspect

```
unitsImageAspect <FLOAT> ;
```

The normalised region may be mapped to an image aspect extraction of the monitor source full image (pre or post monitor mask).

This is achieved by specifying the target image aspect. Given the monitor source image and aspect ratio, the normalised region will automatically be adjusted for 'letterbox' or 'pillarbox' display of the target aspect ratio.

unitsObeyMask

```
unitsObeyMask <INT> ;
```

where INT can be 0 or 1.

The normalised region may be mapped to the visible (post monitor mask) image pixel size in x and y.

line

```
line <FLOAT x0> <FLOAT y0> <FLOAT x1> <FLOAT y1>;
```

Draws a line from coordinates x0,y0 to coordinates x1,y1 using the current coordinate system and draw style.

lineWeight

```
lineWeight <FLOAT> ;
```

How wide to draw lines, in pixels.

ellipse

```
ellipse <INT x0> <INT y0> <INT Rx> <INT Ry> ;
```

where Rx is X radius and Ry is Y radius.

Draws an ellipse with centre at coordinates (x0,y0) and size 2*Rx by 2*Ry, using the current coordinate system and draw style.

polygon

```
polygon <INT x0> <INT y0> .. <INT xN> <INT yN> ;
```

Draws a multi-point polygon from (x0,y0) to (x1,y1) to .. (xN,yN), using the current coordinate system and draw style. If the draw style is filled and the polygon is convex, it will be filled on the inside.

rectExtraction

```
rectExtraction <INT x0> <INT y0> <INT x1> <INT y1> ;
```

Draws a rectangle from (x0,y0) to (x1,y1) using the current coordinate system and draw style.

If the draw style is *filled* the rectangle will be filled on the outside, up to the outer limit of the monitor source image. This element is intended for use when a solid or semi-transparent 'masking' or 'blanking' region is required.

If the draw style is not filled, an *open* rectangle will be drawn with the current line style.

text

```
text <INT x> <INT y> "<STRING>" ;
```

Draws the specified string at (x,y) using the current coordinate system and draw style.

Note that you can use **text macros**, which will be expanded on display. See below.

textSize

```
textSize <FLOAT> ;
```

Set the size of text drawn.

color

```
color <FLOAT R> <FLOAT G> <FLOAT B> <FLOAT A> ;
```

Set the color (Red Green Blue Alpha) for drawing.

fill

```
fill "<FILL>" ;
```

where FILL is *solid* or *open*.

Set the fill mode.

anchor

```
anchor "<VERT>" "<HORIZ>" ;
```

where :

String	Values
VERT	bottom, middle , top
HORIZ	left, center , right

This defines the horizontal and vertical positioning for :

- *text* elements
- image elements

image

```
image <INT x> <INT y> "<PATH>" ;
```

where PATH is full path to image file.

Draw specified image at (x,y) using the current coordinate system and draw style.

Images should be in **PNG format.** The image path can be *relative* (to specification file) or given as an *absolute* path.

origin

```
origin "<VERT>" "<HORIZ>" ;
```

where :

String	Values
VERT	bottom , top
HORIZ	left , right

Define the coordinate origin for all drawing operations.

Macro Expansion

Macros are available for use with the *text* operator and will be expanded to the associated information.

Macro Format

To specify a macro, use a text element e.g.

```
text 20 50 "Name:  ##srcName" ;
text 220 80 "Frame: ##recTimeFrames" ;
```

Available Macros

Macro Text	Meaning
Source Information	
##srcTime	Source time (auto-set from project)
##srcTimeFrames	Source time in frames
##srcTimeTimecode	Source time as timecode
##srcKeycode	Source time as keycode (if available)
##srcTape	Tape name
##srcFilm	Film name
##srcClip	Clip name
##srcScene	Scene name
##srcName	Material Name
##srcDescription	Description
##srcLocation	Location (path on disk)
Record Information	
##recTime	Record time (auto-set from project)
##recTimeFrames	Record time in frames
##recTimeTimecode	Record time as timecode

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##segmentVersion	Version number of segment
Audio Information	
##audioName	Audio material name
##audioOriginator	Audio originator/creator (e.g. Pro Tools)
##audioTimecode	Audio timecode
##audioTimeFrames	Audio timecode as frames
##audioReference	Audio reference as per originator
##audioChannels	Number of audio channels
##audioSampleRate	Sample rate of audio
Miscellaneous	
##headLength	Length of segment head in frames
##tailLength	Length of segment tail in frames
##clipLength	Length of visible segment in frames

Example Grids

For further examples, see the grids file in folder :

`C:\Nucoda\2014_1\root\monitorGrids\`

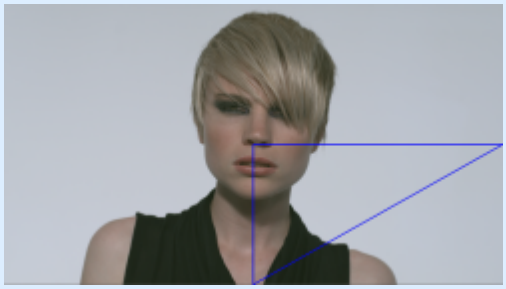
and HUD's in folder :

`C:\Nucoda\2014_1\root\monitorHUDs\`

```
monitorGrid 1.0 -1
{
   name "DV Logo" ;
   units "normalised" ;
   textSize 64.0 ;
   color 1.0 0.0 0.0 0.8 ;
   text 0.1 0.05 "Digital Vision" ;
}
```

```
monitorGrid 1.0 -1
{
   name "Poly" ;
   units "normalised" ;
   fill "solid" ;
   color 1.0 0.0 0.0 0.33 ;
   lineWeight 3.0 ;
   polygon 0.5 0.0 1.0 0.5 0.5 0.5 ;
}
```

```
monitorGrid 1.0 -1
{
   name "Poly2" ;
   units "normalised" ;
   fill "open" ;
   color 0.0 0.0 1.0 1.0 ;
   lineWeight 3.0 ;
   polygon 0.5 0.0 1.0 0.5 0.5 0.5 ;
}
```



```
monitorGrid 1.0 -1
{
   name "AS Rect" ;
   units "normalised" ;
   fill "solid" ;
   color 1.0 0.0 0.0 0.33 ;
   rectExtraction 0.25 0.25 0.75 0.75 ;
}
```

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```
monitorGrid 1.0 -1
{
   name "Center Cross" ;
   lineWeight 3.0 ;
   units "normalised" ;
   color 1.0 1.0 1.0 1.0 ;
   polygon 0.0 0.0 0.0 1.0 1.0 1.0 1.0 0.0 ;
   polygon 0.0 0.0 0.0 0.5 1.0 0.5 1.0 0.0 ;
   polygon 0.0 0.0 0.0 1.0 0.5 1.0 0.5 0.0 ;
}
```

```
monitorGrid 1.0 -1
{
   name "Safe Areas" ;
   lineWeight 2.0 ;
   units "normalised" ;
   color 1.0 1.0 1.0 1.0 ;
   polygon 0.05 0.05 0.05 0.95 0.95 0.95 0.95 0.05 ;
   polygon 0.1 0.1 0.1 0.9 0.9 0.9 0.9 0.1 ;
   polygon 0.0 0.0 0.0 1.0 1.0 1.0 1.0 0.0 ;
   lineWeight 3.0 ;
   line 0.45 0.5 0.55 0.5 ;
   line 0.5 0.45 0.5 0.55 ;
   anchor "top" "left" ;
   origin "top" "left" ;
   textSize 20.0 ;
   color 0.9 0.9 0.9 0.9 ;
   text 0.056  0.06 "PICTURE  SAFE" ;
   text 0.106  0.11 "TITLE  SAFE" ;
}
```

```
monitorGrid 1.0 -1
{
   name "Greyscale" ;
   units "pixels" ;
   color 1.0 1.0 1.0 1.0 ;
   anchor "bottom" "left" ;
   origin "bottom" "left" ;
   image 0 0 "greyscale2.png" ;
}
```

```
monitorGrid 1.0 -1
{
   name "full info all" ;
   units "pixelsFullWindow" ;

   anchor "top" "left" ;
   origin "top" "left" ;
   textSize 14.0 ;
   text 20 20 "##segmentVersion" ;
   text 20 50 "Name:  ##srcName" ;
   text 20 80 "Description:  ##srcDescription" ;
   text 20 110 "Tape Name:  ##srcTape" ;
   text 20 140 "Keycode:  ##srcKeycode" ;

   anchor "bottom" "left" ;
   origin "bottom" "left" ;
   textSize 14.0 ;
   ...
   ...

   anchor "top" "right" ;
   origin "top" "right" ;
   textSize 14.0 ;
   text 20 20 "audio: ##audioName" ;
   text 20 50 "originator: ##audioOriginator" ;
   ...
}
```

HUDs Specification

The Head Up Display (HUD) configuration is the same as for the Grids.

Masks Specification

Mask/Blank areas of the image. This is a ***view only*** mode and is not exported or rendered.

2.35 extraction.

User defined.

File Specification

- A masks file must end in the extension '**.masks**', e.g. test.masks
- It should be a plain text file

Each specification file specifies *one or more masks*, each identified by **unique name** (a *name* parameter).

Format

The mask file format is as follows :

```
monitorMasks 1.0 -1
{
  monitorMask 1.0 -1
  {
    <mask specification>
  }

  monitorMask 1.0 -1
  {
    <mask specification>
  }
  ...
}
```

The *mask specification* section is described below.

NOTE

- Mask specification lines must end with a *semi-colon* ";" character.
- A '#' character at line start delimits a **comment**. Rest of line is ignored.
- Strings should be **quoted** i.e. "string".
- There should be a **space** between each identifier and before the terminating semi-colon.

Mask Specification

name

```
name "<STRING>" ;
```

This is the name of the mask as shown in the GUI drop-down list.
Mask names should be unique.

units

```
units "<UNITS>" ;
```

where UNITS are :

pixels	By default the coordinate system is ***absolute*** image pixels, lower left to top right. Elements are drawn relative to the lower left corner of a pixel.
normalised	Normalised coordinates map the range 0.0..1.0 to the monitor source full image pixel size in x and y.

unitsImageAspect

```
unitsImageAspect <FLOAT> ;
```

The normalised region may be mapped to an image aspect extraction of the monitor source full image (pre or post monitor mask).

This is achieved by specifying the target image aspect. Given the monitor source image and aspect ratio, the normalised region will automatically be adjusted for 'letterbox' or 'pillarbox' display of the target aspect ratio.

rect

```
rect <INT x0> <INT y0> <INT x1> <INT y1> ;
```

Where :

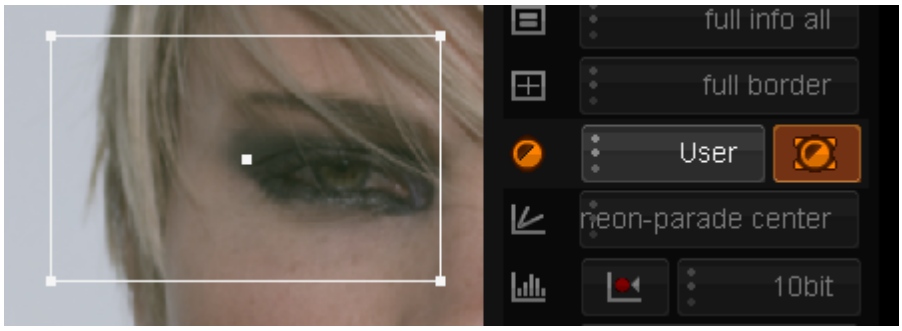
(x0,y0) is rectangle bottom-left.
(x1,y1) is rectangle top-right.

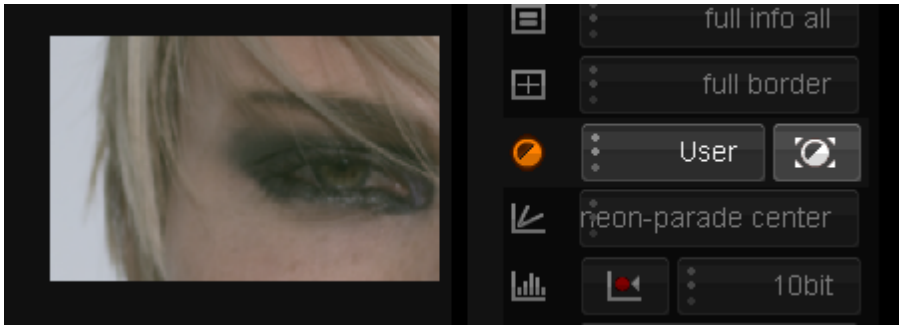
Mask rectangle defined from x0,y0 to x1,y1 using the current coordinate

system. The area outside this rectangle will be blanked.

User Masks

A special mask named "User" will also appear in the GUI list. This allows us to set the mask size and position interactively.



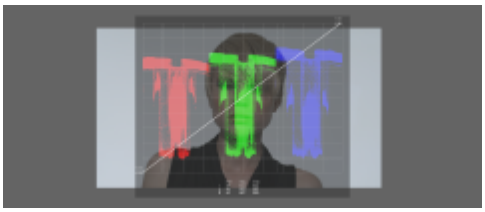


Example Mask Specifications

```
monitorMask 1.0 -1
{
    name "1920x1080" ;
    units "pixels" ;
    rect 0 0 1920 1080 ;
}

monitorMask 1.0 -1
{
    name "10% in" ;
    units "normalised" ;
    rect 0.1 0.1 0.9 0.9 ;
}
monitorMask 1.0 -1
{
    name "4:3" ;
    units "normalised" ;
    unitsImageAspect 1.333 ;
    rect 0.0 0.0 1.0 1.0 ;
}
```

Graphs Specification

Display a graph or histogram of image colour map.



Parade style centred.

Fill style south-west.

File Specification

- A graphs file must end in the extension '**.graphs**', e.g. test.graphs
- It should be a plain text file

The format used for a Graph file is simpler than that used for Grids and Masks.

Each specification file specifies *one or more graphs*, each identified by **unique name** (a GraphID string) and containing a list of drawing instructions.

Graph File Format

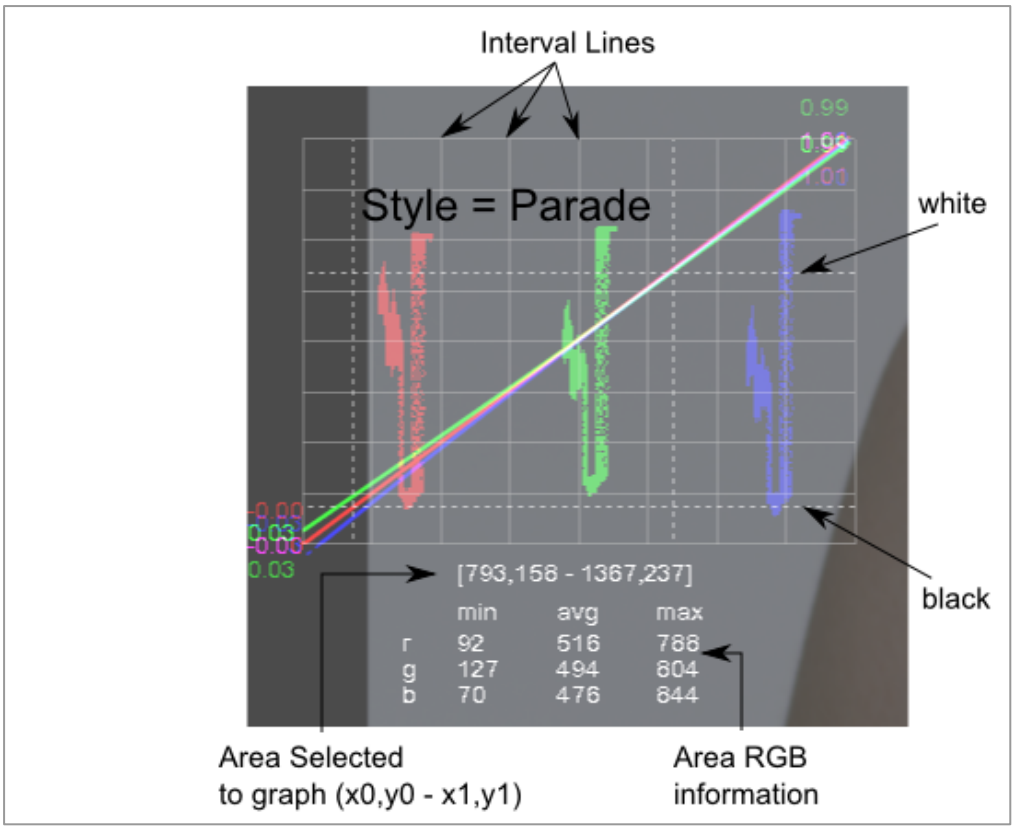
```
// This is a comment and ignored
<GraphID 1>
{
    <Graph Specification>
}

<GraphID 2>
{
    <Graph Specification>
}
```

Graph files :

- Do **not** use *semi-colons* to terminate lines
- Use C++ style *comments* (two characters "//" at line start)

Overview

The main elements of the graph are shown below :



Main Parameters

GraphID

The ***unique*** identifier for the graph e.g.

```
NameOfGraph
{
    ....
}
```

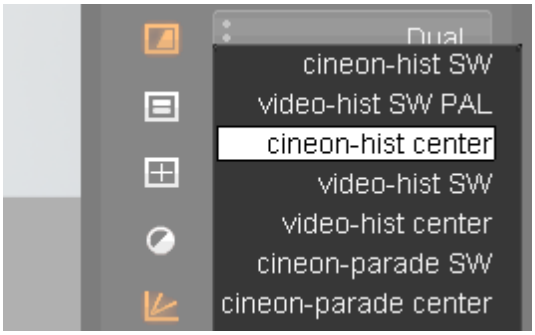
This identifier is not displayed.

> ! This identifier must **not** contain any spaces.

name

```
name   "<STRING>"
```

This is the name displayed in the GUI Graph drop-down list e.g.



Graph *name* in drop-down list

intervals

```
intervals  <INT>
```

The *intervals* parameter defines the total number of solid lines drawn to mark *intervals* on the graph. See *overview* diagram above.

black

```
black  <FLOAT>
```

The *black* parameter specifies the position of the dashed line representing the **black** point. See *overview* diagram above.

It is given in *normalised* coordinates (0.0 to 1.0).

white

```
white  <FLOAT>
```

The *white* parameter specifies the position of the dashed line representing the **white** point. See *overview* diagram above.

It is given in *normalised* coordinates (0.0 to 1.0).

Current Section

The *current* section is **optional**.

```
current
{
    origin "bottom" "left"
    offset 0 0
    size   800 600
    style "parade"
}
```

origin

```
origin "<STRING V>" "<STRING H>"
```

This defines the *vertical and horizontal* positioning of the graph.

Where :

STRING V Vertical alignment.
Values : bottom center (or centre) top

STRING H Horizontal alignment
Values : left center (or centre) right

offset

```
offset <INT x> <INT y>
```

This is the (x,y) position of the graph inside the monitor display area.

(0,0) is bottom-left.

size

```
size <INT w> <INT h>
```

This is the (width,height) in pixels of the graph.

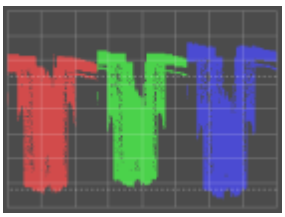
style

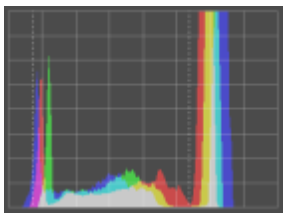
```
style "<STRING S>"
```

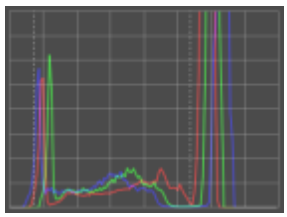
Where :

STRING S Style chosen
Values : parade fill line

This defines the type of graph to display.


parade


fill


line

Compare Section

The *compare* section is **optional**.

```
compare
{
    origin "bottom" "left"
}
```

If present, this defines the location of the second comparison graph when in compare mode. The *origin* parameter is as per the *current* section but refers to the location of the second comparison graph.

Example :

```
current
{
    origin "bottom" "left"
    ....
}

compare
{
    origin "top" "right"
}
```

Dual Comparison Mode with Graphs

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[8] Mesa

Mesa 3-D graphics library
Version: 7.0

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